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AND
Railway News
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Speed and the Permanent Way

Mr. Gilbert Szlumper, speaking at the winter dinner of the Permanent Way Institution last Saturday, spoke of the persistent demand for speed and said he had no doubt that it would not be long before 100 miles an hour would become quite common on railways. We agree with him, although we would put the importance of punctuality before that of speed, which, in this country where punctuality is at a low ebb, will give the permanent way man more time to prepare. Of course, punctuality is not enough, and we shall eventually have much higher speeds than are now usual as well. To ensure comfort to passengers in these faster trains, which will sustain 90 to 100 miles an hour on favourable stretches, and will probably touch even higher maximum speeds, the alignment level of the rails will have to be consistently good, not only in appearance but under load. The Permanent Way Institution can stimulate its members to achieve this very high standard of maintenance, and doubtless will do so. Irregularities in rail levels of an inch here and there, not perhaps of great importance under 70 or 80 miles an hour trains, will be too much in the future. Nothing worse than a quarter of an inch will be tolerated, and not even so much as that in alignment.

Cab Signalling or A.T.C.?

In this issue an abstract is given of the discussion which took place in January of last year at the Cairo International Railway Congress on the subject of automatic train control, and which has just been published by the Congress Association. The most notable thing about this discussion was the controversy over the relative merits of simple cab signalling and of automatic devices for stopping trains should a signal be ignored. The latter is commonly known as automatic train control, or A.T.C. Mons. Duchatel put the case for the former as well as it has ever been put, but the consensus of opinion appeared to be in favour of the automatic brake application. It is noteworthy that the Swiss Federal Railways have recently decided to equip their electrified lines with a system of A.T.C. worked in conjunction with the dead-man's handle and speed recorders. The German State Railway is proceeding with the equipment of its lines similarly, but without cab signalling, and, of course, the Great Western in this country has already equipped all its principal main lines. In America both A.T.C. and simple cab signalling are widely used, the Pennsylvania Railroad having firmly adhered to the latter, and in that respect being in agreement with French opinion.

The Week's Traffics

While passenger train and merchandise traffics of all the four group companies show advances for the past week coal class receipts are down except on the London & North Eastern. For the four weeks of the current year the traffics of the four companies taken together show an increase of £723,000 or 7·51 per cent. Of this advance £546,500 is due to merchandise traffic which represents a gain of 16·77 per cent. In passenger train receipts there is a net increase for the four weeks of £58,000, or 1·51 per cent. Coal class traffics for the same period have improved by £118,500 or 4·65 per cent.

	4th Week					
	Pass. &c.	Goods, &c.	Coal, &c.	Total.	Year to date	Inc. or dec. %
	£	£	£	£	£	
G.W.R. ..	+ 7,000	+ 24,000	− 3,000	+ 28,000	+ 90,000	+ 5·47
L.M.S.R. ..	+ 19,000	+ 67,000	− 21,000	+ 65,000	+ 301,000	+ 7·76
L.N.E.R. ..	+ 4,000	+ 73,000	+ 7,000	+ 84,000	+ 290,000	+ 10·15
S.R... ..	+ 16,000	+ 6,000	− 1,000	+ 21,000	+ 42,000	+ 3·37

On the Liverpool Overhead and Mersey Railways the improvement in the week's traffics has brought their respective aggregate increases up to £280 and £1,018. The Belfast & County Down is now £61 to the good on the year, and the Great Southern records an improvement of £5,276 to date.

Pullman Car Results

Net receipts of the Pullman Car Co. Ltd. for the year ended September 30, 1933, were £66,968, an increase of £1,239, or 1·88 per cent. in comparison with the previous year. During the years of acute depression in the railway industry the main loss of revenue by the Pullman Car Company has been caused, not in domestic traffic, but by the severe contraction of its "en route" traffic between London, Dover and Folkestone. Its revenue from this source dropped from £101,273 in 1929 to £73,982 in 1931, and £43,198 in 1932, but in 1933 there was a slight recovery to £45,468. Gross receipts for the year under review amounted to £270,046, an increase of £10,043 or 3·86 per cent., but the working expenses of £203,078 showed an increase of £8,804 or 4·53 per cent., the operating ratio being 75·20 per cent. against 74·72 per cent. On account of the new Brighton electric service in the first year of its development both expenses and interest charges were higher. In all the circumstances the directors consider that the results of the past year are not unsatisfactory. The company served 1,099,039 travellers (an increase of 4·8 per cent.), and it is hoped that the improving conditions in England will make amends in the current year for the loss of revenue in Scotland caused by the L.M.S.R. giving notice that its contract with the Pullman Company on the point of termination would not

be renewed. Reference is made in the report to the low price for which the 22 Scottish cars had to be sold because services in England could not be found for them.

Overseas Railway Traffics Some ups and downs have taken place in Argentine railway traffics during the past fortnight. While the Great Southern and the Western receipts have been showing substantial decreases, those of the Central Argentine have been considerably improving and the Pacific has made a small advance. In the two weeks the Great Southern has had decreases aggregating £57,000, so that its increase on the whole year has now been brought down to £71,000, and the Western's decreases for the fortnight amount to £25.000. The Central Argentine, on the other hand, records a total advance of £52,000 during the fortnight, and the Pacific one of £3,000. On the Entre Rios the traffic position during the two weeks has improved by £10,900, and its decrease for the year to date has now been reduced to £5,900. The Canadian Pacific has started well in 1934, and its revenue statement for December, 1933, shows that it ended the year with an increase of £155,400 in net earnings, notwithstanding a decrease of £1,933,400 in gross earnings.

Railway.	No. of Week.	Weekly Traffics.	Increase or Decrease.	Aggregate Traffic.	Increase or Decrease.
		£	£	£	£
Buenos Ayres & Pacific	30th	135.000	+ 3.000	2 902 000	— 164.000
Buenos Ayres Great Southern ..	30th	260.000	— 15.000	5.611,000	+ 71.000
Buenos Ayres Western	30th	75.000	— 15 000	1.861,000	— 94,000
Central Argentine	30th	216.000	+ 36 000	4.847 000	— 744 000
Canadian Pacific	2nd.	393 000	+ 88 800	778,600	+ 148.800
Bombay, Baroda & Central India	41st	168,975	+ 8,475	5,936,050	+ 148,500

B.A. Provincial Railway Company The Buenos Ayres Provincial Railway Company, a French-owned undertaking of 1,267 km. on the metre gauge, was formed in 1905. It has a central station in Buenos Aires in the Avenida de Velez Sarsfield but no direct railway connection with the port. In addition to the Buenos Aires-Rosario main line there are westerly and south-westerly lines to General Villegas and V. de la Plata. At many points it competes with the older-established British companies and on the main line has to meet river competition, while its short distance traffic is particularly susceptible to road competition. For the year ended June 30, 1933, gross receipts were 134,829,824 fr., a decrease of 31,386,565 fr. in comparison with 1931-32, but in the working expenses of 120,683,007 fr. there was a saving of 15,333,078 fr., and net receipts were, therefore, 16,053,487 fr. lower at 14,146,817 fr. The operating ratio was 89·50 per cent. Exchange operations resulted in a loss of 8,951,269 fr., and net revenue after making provision for this and other matters amounted to 6,505,365 fr. Bond interest and amortisation require 4,810,533 fr., and it has been decided to utilise the balance of 1,694,832 fr. as a further provision against exchange losses, instead of paying a dividend. For 1931-32 a dividend was paid of 25 fr. a share on 100,000 shares of 500 fr. each.

A Tour in Brittany It is a somewhat curious fact that Brittany, although a favourite resort of many well-informed English-speaking travellers, is still comparatively unknown to the vast majority of holiday-makers in this country. Yet its charms are many and unique, and in order to bring them home to the British holiday-maker the French State Railways are issuing an attractive booklet wherein Lady Edward Gleichen sets forth a series of delightful recollections of a 12-days' tour in Brittany, "and a little way outside," the reading of which will doubtless inspire many to explore this picturesque region for themselves. The little book is just a plain, unvarnished account of what proved to be a peculiarly happy holiday, but at the same time it shows the writer to be keenly observant and contains much that is calculated to be of real help to the prospective holiday-maker; in this connection, indeed, the summarised hints on the last page should on no account be missed. That page ends with the remark: "Do go to Brittany yourself, reader, and see if you agree"—a piece of good advice which is cordially endorsed by M. Dautry, General Manager of the French State Railways, in an appreciative introduction, written in English and reproduced in facsimile. It remains to add that the publication—which is obtainable at the French State Railways' new office, 20, Cockspur Street, S.W.—is enriched by a number of neat little illustrations reproduced from drawings by Major-General Lord Edward Gleichen: and that there is, besides, a line map showing the distinguished couple's itinerary.

The Value of Colour It is beyond dispute that passenger rolling-stock with an attractive external finish has a publicity value for its owners; and that one factor at least in the fascination which the steam locomotive has always exerted on male minds in this country has been the smart liveries of colour which have been combined with some measure at least of graceful outline in the locomotives of Great Britain. In other countries the same allurements to the passenger are beginning, by degrees, to come under trial. In New South Wales, for example, the appointment of new Railway Commissioners has been followed by some positively polychromatic rolling-stock developments on that system. The two trains on the Inter-City and Northern Commercial Limited expresses between Sydney and Newcastle are painted red and buff, and four locomotives of the "32" class have been coloured a bright red to match. A new set of cars, handsomely attired in royal blue and cream, is at work on the Caves Express service, and three of the "35" class locomotives have been painted blue, picked out with cream, to correspond. The Daylight Express between Sydney and Nowra has green and cream coaches, with three light green locomotives of the "32" class to match; and some brown engines are in course of preparation to work the Sydney-Goulburn express, which is made up of varnished teak stock. Special arrangements have been made at the running-sheds concerned to maintain these locomotives in a spick-and-span condition.

Stresses in Railway Track Mr. G. S. Gough's paper "On Stresses in Railway Track, by an Extension of the Theorem of Three Moments,"* merits serious attention. For determining the stresses set up in a continuous rail under load the author assumes the supporting sleepers to be equally spaced and that they provide point reactions proportional to their respective deflections. He thus differs from those investigators who have assumed the sleepers to provide support equivalent to a continuous and uniform elastic bed. He points out, too, that investigations based on a single axle are misleading. The maximum load on a sleeper is approximately proportional to the sleeper spacing and almost independent of the moment of inertia of the rail and the resistance of the sleeper to deflection. It is shown that the increase in maximum bending moment under sleepers which, because of decay or faulty packing, are non-supporting, is large and may be of the order of 50 per cent. Joints are also investigated in this paper by the "concentrated support" theory, and the relative merits

* Selected Engineering Paper No. 147. The Institution of Civil Engineers, London, S.W.1.

of suspended and supported types are discussed. Two points of particular interest are, first, assuming any reasonable design of joint, the increase in maximum rail stress is far less than that which may be set up by slack sleepers; and, secondly, although there is but little to choose between the two types of joint considered statically, with the suspended joint a sudden increase of reaction occurs on the sleeper following the joint as the wheel passes over the joint. No doubt this largely accounts for the fact that this sleeper always seems to require more frequent fettling than any other.

Rails 8,662 Ft. Long Extensive permanent way renewal having become necessary in the two-mile-long Brandleite tunnel, on the main line of the German State Railway, between Berlin and Stuttgart, it was decided to weld the new rails into unbroken lengths of 2,640 metres (8,662 ft. 6 in.), leaving a little over 650 ft. at each end of the tunnel, where variation in temperature occurs, with rails of normal length. Even with the use of 30-metre (98 ft. 4 in.) rails now standard in Germany, an excessive amount of welding would have been necessary in the bad atmospheric conditions of the tunnel (for no suspension of traffic was possible), and the number of Thermit welds actually carried out in the tunnel was reduced to 60—15 in each rail—by the expedient of welding (by the flash-butt process) the 30-metre rails into 90-metre (295 ft.) lengths at the Neudietendorf depot before they were taken into the tunnel. No trouble was experienced in the transport of these long rails to the site, over 1 in 50 gradients and round curves of 300-metres (15 chains) radius; six rail wagons were used for each 24 rails, loaded in two tiers, and care was taken to leave roughly $\frac{3}{4}$-in. between each pair of rails, to allow of independent movement. Traffic on the adjacent road was stopped while the transport was in progress.

Shunting Locomotives The normal types of steam shunting locomotive and others with special forms of boiler, cylinders and transmission system, have usually proved satisfactory for the work to be performed and, although operating under conditions which are by no means ideal, they have proved both efficient and economical. On the other hand diesel shunting locomotives have the advantage over reciprocating steam locomotives in that they are much more quickly prepared for service, standby losses are eliminated, and in addition they are more economical on fuel account and can be operated with safety by one engineman. Some of the earlier diesel shunting engines were open to adverse comment on the score of the length of time taken when backing down on to a train and following out the various movements signalled by the yard foreman, but nowadays this type of shunting locomotive is a serious rival to that operated by steam and in some countries notably Germany, large orders for such locomotives are being placed.

The Coefficient of Adhesion With the coming of entirely new types of locomotive there is always a chance that some unforeseen effect will mar its performance and cause disappointment to its designer. The proportioning of its parts in accordance with rules long found satisfactory in application to steam engines may be no insurance against failure, and indeed, the imagination which has been too exclusively occupied with the possibilities latent in steam units will almost certainly be handicapped in getting out diesel or other designs. A more miscellaneous experience of mechanisms is an invaluable asset in pioneer work, but failing this the ability to theorise accurately will minimise the risk of overlooking factors likely to influence the final result. In the February issue of our contemporary *The Railway Engineer,* there appears an article in which the various factors influencing the coefficient of adhesion are given their place in a mathematical formula. Changes of some significance result from altering driving axlebox friction—a fact borne out recently in America, where a conventional locomotive fitted with roller bearings showed a tendency to increased wheel slip—and from increased inertia in the rotating parts connected with driving wheels. Inertia effects are very pronounced during acceleration and braking in electric and diesel-electric units on account of the massive and fast running motor armatures, and the steam locomotive man might well find some of these a little puzzling. However, reference to the theoretical expression for the coefficient of adhesion explains all.

Long Locomotive Runs in Australia The latest report on Commonwealth Railways operations contains a reference to the long runs now made by locomotives working passenger trains on the Trans-Australian Railway between Port Augusta and Kalgoorlie, a distance of 1,051 miles. Prior to the institution of the new arrangements the locomotive workings were divided into four sections, but now the runs are in two sections only, the first covering 513 and the second 538 miles. The longer runs have resulted in considerable economies and other advantages. Fewer locomotives are in actual service, which means a reduction in maintenance and expenditure in the workshops, whilst a very considerable extension of the average mileage per annum of the locomotives in passenger service is effected. In addition, a reduction of staff at out depots has been made and similarly the costs involved in lighting up and washing out the boilers and in the consumption of coal and water have resulted. The new arrangements necessitated provision being made for quick coaling at Tarcoola and Kawlinna, and to aid successful operating on these long runs grease lubrication has been installed in place of the oil lubrication previously used. Runs of 513 and 538 miles are the longest regular passenger runs in Australia without change of locomotive and compare most favourably with anything else in the world, being exceeded only, so far as we know, by certain runs in Canada and the United States.

Motive Power for Shuttle Services The class of railway traffic which requires the working of light and frequent trains over short sections calls for careful consideration in respect of the motive power to be employed, and particularly so on narrow gauge lines in countries such as India. There are to-day alternatives to the steam locomotive which can be relied upon to give excellent service in this class of traffic, and mention may be made more especially of diesel and steam railcars, as well as light locomotives which have proved efficient and have taken their place as standardised productions upon which every reliance may be placed. The 2-4-2 type of tank engine built by W. G. Bagnall Limited for light fast shuttle service on the 2 ft. 6 in. gauge section of the Mysore Railways is an excellent example of design for the purpose named. This engine, which we illustrate and describe elsewhere in the present issue, is, with two others of the same type, giving highly satisfactory results, and it will be noted that the equipment throughout is of a fully modern character, including as it does poppet valves and gear, electric lighting system, automatic couplings and other fittings associated with main line practice on Indian railways.

The G.W.R. Chairmanship

SINCE the lamented death of Lord Churchill on January 3, the Board of the Great Western Railway Company has lost no time in electing a successor to the vacant Chair. Sir Robert Horne, K.C., M.P., a distinguished figure in public life, and who, in the Coalition Government of 1918-22, held successively the positions of Minister of Labour, President of the Board of Trade, and Chancellor of the Exchequer, was unanimously offered the Chairmanship, which, after due consideration, he has accepted. As announced elsewhere in this issue, he was formally appointed Chairman at the first Board Meeting held since the death of his predecessor.

In the brief interregnum there was a certain amount of speculation and comment in the daily press as to who would be selected. Possibly the interest aroused is accounted for by the fact that the Great Western is the one British main line company that has not lost its identity owing to grouping, and whose name goes back over a period of ninety-nine years. Moreover, Lord Churchill's Chairmanship, extending as it did for over a quarter of a century, commenced in the pre-war period. The long sequence of difficulties which British railways have encountered since then are well known, and it was largely due to Lord Churchill's wise guidance that the Great Western has so successfully overcome them. He was constantly in touch with Members of Parliament when measures affecting railways were in progress, and in the critical period culminating in the passage of the Railways Act, 1921, it was due largely to his diplomatic skill, courtesy and hard work that the measure was reshaped so as to make it generally acceptable to the railway companies, their employees and the public. We mention this again because it is evident from recent comments by writers in the daily press and by railway stockholders, that there still exists much confusion of thought as to the administrative and executive functions of a railway board and its chief officers. The idea still seems to be prevalent in some quarters that the Chairman of a railway company occupies a similar position to that of the Managing Director of an industrial company. The only British railway company where this may be said to apply is the London Midland & Scottish where Sir Josiah Stamp occupies the dual position of Chairman of the Company and President of the Executive. In fact, as we pointed out last week, *The Evening Standard*, in commenting on the Great Western organisation, obviously confused it with that of the L.M.S.

To find a worthy successor to Lord Churchill, who throughout his long period of Chairmanship fully realised that it is the duty of a Board to direct and not to interfere in details, and under whose guidance the reputation of the Great Western Railway was so greatly enhanced, was no easy task. We think both the company and Sir Robert Horne are to be congratulated on the selection, and his acceptance. Lord Churchill was 41 years old when he was elected a director and he was appointed Chairman three years later. It was fully expected he would continue to occupy the office he had so very ably and characteristically filled for many years to come. Sir Robert Horne assumes the responsibility at a later stage in life, being 62, but he has been a director for over ten years and is well acquainted with Great Western traditions and must have favourably impressed his colleagues or their choice would not have fallen upon him. Comment has been made as to the numerous directorships held by Sir Robert Horne, but *The Times* last Saturday put this in its proper proportions by pointing out that in the long list published in *The Directory of Directors*, a number of the companies named were associates of others; more than one of which had a purely subsidiary existence involving no extra duties. Apart from the Great Western, Sir Robert's most important directorships are Imperial Smelting Corporation Limited, Lloyds Bank Limited, Commercial Union Assurance Co. Ltd., P. & O. Steam Navigation Company, and the Suez Canal Company.

Train Noises

LONG before the formation last autumn of the Anti-Noise League, engineers responsible for the construction and operation of running machinery had been striving to make mechanical agents work as silently as possible. Often the end sought was increased efficiency, noise in a machine betokening wasteful conflict between its component members, or the expansion of gases liberated before being properly exhausted of their energy. In not a few instances, however, increased comfort was the end sought, the engineer never having needed highly trained psychologists to tell him that people disliked noise. The main line railways of this country were using the more silent wood-centred wheel on passenger stock far back in the last century, and efforts to mitigate the noise on tube and other underground railways in London have to our knowledge been continued over a period of many years. Now that the human dislike of noise has been rediscovered by scientific tests, it is thought of as something newly revealed, and we can be sure that the present agitation owes much of its vehemence to the belief held in certain quarters that the problem of noise is one which has never yet received serious consideration. Unfortunately for the expectations of those who imagine that a day's thought would suggest the universal remedy, the study of acoustic phenomena is as old as engineering itself, and its recommendations on the subject of noise mitigation are almost exclusively impracticable.

The source of all noise is elastic vibrations, and engineering structures are necessarily made of elastic materials susceptible to such vibrations. In the effort to stop sound reflection the Underground engineers have lined tunnels here and there with absorbent materials, but experiments such as this all point to the conclusion that those materials are most effective in deadening sound which are least able to hang together and exhibit useful structural properties. To be incapable of throwing off sound waves the reflecting surface must behave as soft putty does when pelted with peas. Either it must exhibit perfect plasticity (which means that it will fulfil its function of energy absorption by being continuously deformed) or it must entrap the impinging disturbance and cause it to become lost in a maze of small interstices. Felt is an excellent substance for entrapping and annihilating sound waves, and it is used in the studios and audition rooms of many gramophone and similar companies, and in some American railway stations, but the thickness required is considerable and for long tunnels the cost is prohibitive. Also felt has a strong affinity for moisture and in a water-logged condition it cannot remain useful for very long. Much can be done, and has been done in abatement of the noise nuisance by supporting elastic members such as panels so as to ensure that there can be no resonances. Another line of attack is to concentrate on noises having wave lengths known to be the most disagreeable, and striving not so much to reduce them as to alter their pitch.

How very small a source of considerable irritation may ultimately prove to be can be judged from the enormous possibilities for annoyance latent in the tiny aluminium diaphragm of the gramophone soundbox. On considering its size and the number of its parts, we think that the modern train is a comparatively mild offender. And, after all, when the slumber inducing rumble of the well

maintained express is silenced and its rhythmical tale of progress fast or slow is heard no more, what are we going to do about the sniff of the man in the opposite corner, the peace shattering noise of a newspaper suddenly turned over, and the never ending stream of trivialities articulated in singularly penetrating key wherever two or more women are gathered together? All must have experienced the increased susceptibility to little noises which comes with the deathly stillness of the tube tunnel after the train has stopped, and all will sympathise with the man who, being used to a bedroom facing the sea, could not sleep through the ghostly quiet of a London night, and bought a loud sounding cuckoo clock to induce slumber. Music or clatter is the rule, and quite rightly so, in restaurants where soup is served to all manners and conditions of men. Sounds which are excusable amidst general din become unpardonable in church-like places. Thus the problem of noise, like many others, is best solved by compromise. If perfect silence can be guaranteed, by all means let us have it, but if it is to be a choice between the purposeful sounds which still accompany rapid travel, and the annoying little fidgetings of our fellow traveller, let us keep and rejoice in the present mechanical divertissement.

Monsieur Dautry Explains

THE General Manager of the French State Railways, Monsieur Raoul Dautry, never lets critcisms of the undertaking over which he presides pass unanswered. The staff journal of the Chemins de fer de l'Etat contains the text of some letters addressed by him to various journals, such as the *Temps Nouveaux, Action Française, Revue de Paris,* and *Redressement Français,* in reply to articles therein. These appeared before the Lagny accident on the Eastern Railway and have nothing to do with the agitation raised by that unfortunate event. M. Dautry shows that most persons who rush into print with attacks on the State Railways are often ignorant of the facts most essential to the forming of a correct judgment. It is frequently forgotten, for instance, that large sums of money had to be found to make good the maintenance neglected during the last years of existence of the former Western Company. If the State system has had serious deficits at times in past years they have now been diminished, and the deficit is no worse in proportion than it is on the company-worked lines. The State system runs through country of a poorer nature than the others, for the most part, and is the only one whose most productive main line is subjected to intense competition from a large river. It has also much less transit traffic than any other French railway, less even than the Paris-Orleans, which most nearly resembles the State system in many respects.

M. Dautry has no difficulty in disposing of one critic, whose whole argument is invalidated by his having forgotten the change in the value of the franc since 1923, and he shows that, in spite of higher wages, freight traffic costs have been reduced per tonne-kilometre and a better service has been given. One journal had made much of a circular to the staff concerning defective tyres, but it had misunderstood the meaning of a technical term used therein and so had been led into great exaggerations. The staff on the State system are, M. Dautry declares, as capable, loyal and conscientious as on the other lines, and it is a particularly unhappy task, especially in these hard times, to try and set one railway system off against another as an instrument in an anti-State railway agitation. M. Dautry's letters are models of clearness, restraint and courtesy.

A Bessemer Steel Revival

IT is a matter for comment that in 1931, whereas in France, Germany, Belgium, and Luxembourg, three-fifths of the total steel production on the Continent of Europe—15,189,000 out of 24,955,000 tons—was of Bessemer steel, in the corresponding year Great Britain made only 113,000 out of 5,203,000 tons by the Bessemer process. The Continental production was exclusively basic Bessemer steel, whereas the British production was only of acid Bessemer steel, and confined to one steelworks at Workington, on the West Cumberland coast. Yet in the first decade of the present century Bessemer steel production in this country rose very nearly to the 2,000,000-ton level. It is, of course, open-hearth steel production, with its superior methods of control, that has replaced the Bessemer process, largely as a result of war conditions. On the other hand, post-war conditions, and the stress of Continental competition, have compelled a reconsideration of the claims of Bessemer steel manufacture from the standpoint of economy in production. We have already referred to the enterprise of one firm of steelmakers, who, after a lapse of nine years, during which no basic Bessemer steel has been made in this country, are erecting a basic Bessemer steel plant on a large scale at Corby. Further, the West Cumberland steelworks is now modernising and extending its acid Bessemer plant, so that a considerable increase in Bessemer steel production will take place in the near future.

It was doubtless the prejudice of British engineers against basic Bessemer steel—born of the uncertainty of its quality which, in its turn, was largely due to the methods of its manufacture—that resulted in the extinction of basic manufacture—that resulted in the extinction of basic Bessemer working in Great Britain about the year 1925. But we cannot help thinking that the erasure of this process from all standard specifications by the British Engineering Standards Committee (now called the British Standards Institution) in 1930 was an unduly hasty move. This may have been done with a view to limiting the importation of basic Bessemer steel from abroad, but the results in this direction appear to have been negligible until the imposition of the tariff, and the future effect will be to tie the hands of the firm who are reintroducing the process into Great Britain unless it is readmitted to the B.S.I. Specifications—in particular No. 15, for Structural Steel—with the possible safeguard that such steel must be of British manufacture. Basic Bessemer steel, made under present-day conditions, is an excellent structural material, particularly suitable for welding, and for tube-making (the primary objective of the erection of the plant at Corby) and tinplate bars is preferred to any other. Acid Bessemer steel, of course, requires little advertisement; it is noted for its free-cutting properties, for the ease with which it can be welded, and also for ease in manufacturing in varying degrees of hardness. Railway rails rolled from acid Bessemer steel have also earned a justifiable reputation for their soundness and hard-wearing quality in all parts of the world.

THE RIGHT MEN FOR THE RIGHT JOBS.—The Prince of Wales visited the offices of the British Executive Employment Society at 133, Oxford Street, London, W.1, the other day and, after personally testing the elaborate and ingenious system of registration, known as the Codex Technicus, expressed the opinion that no other organisation existed which was in so good a position to meet the requirements of industry for persons of executive ability. On the other side, of course, those so qualified who are at present out of employment have the best possible opportunity of finding suitable work.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of Correspondents)

L.M.S.R. Locomotive Names

Jodhpur,
India.
January 2.

To the Editor of The Railway Gazette

Sir,—I would heartily endorse Mr. J. A. Whaley's suggestion in The Railway Gazette of September 15 last that the old North-Western names should be perpetuated on the L.M.S.R. As a matter of fact the name borne by No. 6200 *is* an old North-Western one, the *Princess Royal* being, if I remember rightly a 2-2-2 single belonging to Mr. Ramsbottom's "Lady of the Lake" class; it would be good to see other engines in the future similarly treated. There is a great variety of names of the Webb era still to be drawn from, though many of these were subsequently adopted by Mr. George Whale, when Chief Mechanical Engineer.

Yours faithfully,
J. P. BARDSLEY

Handsome Locomotives

31, Tennyson Street,
Nottingham.
January 26.

To the Editor of The Railway Gazette

Sir,—Surely the original L.M.S. standard Moguls were the most hideous looking examples of the type imaginable. Pleasing lines do not make efficiency, but a little more consideration might well be given to external appearance without upsetting the good working qualities of the engine. Mr. Stanier's new series of 2-6-0's, illustrated in your issue of January 12, are a vast improvement in appearance on the old type and the motion is quite as accessible without the abnormally high running plate and inclined cylinders. Another disadvantage with excessively inclined cylinders (particularly outside ones) is the pronounced roll set up by the engine when working hard at low speeds. I have frequently observed this failing with certain types, it being due, no doubt, to lifting action, first on one side then on the other, as the pistons exert their forces. However, that is a side issue, and Mr. Stanier is to be congratulated on the pleasing designs he is turning out for the L.M.S. If they are as efficient as they are handsome there will be no cause for complaint.

Yours faithfully,
J. A. WHALEY

Engineers' Study Circle on Economics

35a, Linden Gardens, W.2.
January 29.

To the Editor of The Railway Gazette

Sir,—The note in your issue of January 19 is another indication that those whose work has done so much to increase the world's real wealth are not content to see their efforts wasted by economic mismanagement. Engineers and scientists realise, perhaps better than most people, that a high standard of living and leisure is possible for everyone to-day. They witness instead the growth of distress and poverty, arising from a pitiable failure to apply common logic to the problems of production and consumption.

In the face of present conditions engineers and scientists must either call a halt to the march of progress, or insist that the benefits they are offering humanity be utilised properly instead of being perverted. However impotent to find a solution the traditional economist and politician may be, to the technical man there is no inscrutable mystery about the present problem. He knows it is basically one of the proper distribution of purchasing power, and that, so long as this is inadequate, technical progress must be rendered futile to an increasing extent.

A common agreement on the exact method of making the ample potential wealth of the age available has admittedly not yet been attained; but practical proposals are by no means lacking, and these can be examined critically with a view to their application. Further, a reasoned judgment is far more likely to emerge from an investigation by scientific and technical men, than from the bewildered deliberations of politicians whose outlook is fogged by the *débris* of exploded economic shibboleths.

It is to be hoped that the Engineers' Study Circle will be supported by every technical man who desires to see his own work justified.

Yours faithfully,
R. GAUDIN

The Fog Menace

55, Becmead Avenue,
Streatham, S.W.16.
January 30.

To the Editor of The Railway Gazette

Sir,—Can nothing be done to overcome the chaotic condition into which railways fall whenever fogs occur? London has always been badly afflicted with fogs, and very little has been done to meet the trouble they cause. London's railway network is a vast one and responsible for the transportation of the greater part of the population, yet a primitive method of signalling, almost amounting to hand signalling, has been thought sufficient to provide for control during fogs. The Great Western Railway has adopted a system of automatic train control, although it has a comparatively small suburban system, yet the companies possessing large suburban systems do nothing.

Even if it were only to help themselves in the operation of their trains they might instal some method of automatic signalling, either with audible or visual warning in the driver's cab. We recently heard of a driver who climbed a signal post to see whether the signal was "on" or "off," and of a train taking two hours between Waterloo and Clapham Junction, which shows how inefficient semaphore signals and hand-placed fog detonators are.

Yours faithfully,
W. A. SHEPHERD

[Although our correspondent does well to call attention to this matter, he scarcely does justice to the railways. Those of the London Passenger Transport Board are almost all equipped with automatic signalling and train control and suffer little if any delay from fogs. The main line railways, on certain sections—*e.g.*, the Southern out of Charing Cross, Cannon Street, London Bridge, and Holborn Viaduct, and between Coulsdon and Brighton; the L.M.S.R. on its electric lines between Euston and Watford; the L.N.E.R. between Romford and Shenfield—have installed colour light signals, and further sections are being similarly equipped. The Great Western, of course, with its A.T.C., in addition to colour light signalling for some way out of Paddington, suffers probably less than any other main line railway from fog delays. It is a matter of justifying the capital expenditure which regulates the rate at which more up-to-date signalling can be installed on railways where the traffic is heavy and which are liable to suffer from fogs. The acceleration of such work of recent years is noticeable, and will probably continue at an even higher rate henceforward.—Ed., *R.G.*]

PUBLICATIONS RECEIVED

The Road and Rail Traffic Act, 1933. An Explanatory Handbook, by Arthur G. Dennis and T. D. Corpe. London: The Solicitors' Law Stationery Society Limited, 31, Breams Buildings, Fetter Lane, E.C.4. 202 pp., index. 8½ in. by 5½ in. Price 7s. 6d. net.—Now that the greater part of the new Act is in force those who are affected by its provisions should find a volume of this sort almost indispensable for elucidating the many points which are apt to prove puzzling to those not versed in the ways of modern law-makers. In a lengthy introduction, the authors comment on and explain the salient features of the Act and in this as well as in the numerous notes which accompany the text of the measure, printed in full, they bring to bear an intimate experience of the working of the Road Traffic Act and have evidently made a close study of the draft regulations circulated by the Minister during recent months. They admit in a brief preface that some of their opinions may appear to be arbitrary but if they are as well-informed as might be expected that should be an advantage. In an appendix are printed the sections of the Road Traffic Act, 1930, which are amended by the Road and Rail Traffic Act, as well as the three Statutory Rules and Orders already issued under the new Act, and the Fair Wages resolution passed by the House of Commons on March 10, 1909. There is a good index, but its usefulness could be improved, when the next edition is called for, by a little more attention to collation.

A Hundred Years of Inland Transport. By C. E. R. Sherrington. London: Gerald Duckworth & Co. Ltd., 3, Henrietta Street, W.C.2. 376 pp. (not illustrated). 8¾ in. by 5½ in. by 1½ in. Price 15s. net.—In the course of Duckworth's "100 Years Series," it would be difficult to find a subject of greater importance in the progress of the world than that of the development of inland transport. The prominence given in recent years to the controversy between road and rail has perhaps tended to blind many to the primary fact that efficient transport is essential to the continuance of life under our civilisation as at present constituted. This true perspective is constantly kept in mind in the present volume, which is designed not as a text book of transport principles, but as a chronicle of achievement showing the effect of transport on the social organisation of Great Britain. The publishers have been fortunate in obtaining the services of Mr. Sherrington to contribute this volume to their series, for, as Secretary of the Railway Research Service, he is an acknowledged authority, and as a writer he has a facile pen capable of giving a lively interest to the multitude of facts of which a century's transport history is composed. The book contains a very large number of facts, incidents and dates—to such an extent that there must be few events of importance which are unrecorded.

The general scheme adopted is to divide the century into decades, treating each from the point of view of its outstanding characteristics. Railways naturally form the backbone of the story, but turnpikes and inland waterways, telegraphs and telephones, omnibuses and tramways, and motors and bicycles, all find their place and are adequately dealt with. Other cognate subjects included are the carriage of mails, the rise of electric traction, and development of the internal-combustion engine. While mainly Great Britain is discussed, examples from other parts of the world are cited. A helpful bibliography is appended, and the contents of this highly interesting and readable volume are made easily accessible for reference by a comprehensive index.

Mathieson's Handbook for Investors for 1934. London: Fredc. C. Mathieson & Sons, 16, Copthall Avenue, E.C.2. 6½ in. × 3½ in. Pp. 348. Limp covers. Price 5s.—Now in its 35th year of issue, this handy publication gives a useful and concise record of Stock Exchange prices and of dividends for the past ten years of selected securities, particulars for 1933 being compiled up to the end of November. Investments are grouped under 29 main headings, and a comprehensive index facilitates reference to any security mentioned in the publication. At the end of the book will be found the dates of Stock Exchange settling days and holidays, changes in Bank of England minimum rates of discount from 1913 to 1933, and information as to trustee investments. The selection of investments is well made and the statements of the amounts of capital involved in the investments mentioned form a useful feature.

The Railway Diary and Officials' Directory for 1934. London: McCorquodale & Co. Ltd., Cardington Street, Euston Square, N.W.1. 9¼ in. × 6¼ in. × ½ in. 197 pp. Price 3s. 6d.—As in former years, this useful publication consists of three sections, the first and third being printed on primrose-tinted paper, and the second on white paper. Beginning with a two-page calendar, the first section goes on to provide a table for calculating salaries on a basis of 365 and 313 days, respectively, to the year, a wages table (six days to the week), interest, annuity, and investment tables, and postal and banking directories. The middle, or diary, portion carries seven days to a page, and contains five pages for memoranda, cash tables, and pages for recording weekly traffic returns. In the third section is the railway directors' and officials' directory, which in the case of the four group companies and of the Great Southern Railways (Ireland) includes particulars of the exchange of stocks on amalgamation or absorption, besides other financial and statistical information relating to those railways, and to the Great Northern Railway (Ireland). The London Passenger Transport Board, working companies and joint railways in Great Britain and Ireland, the Railway Clearing House, the Railway Benevolent Institution, and the Ministry of Transport also receive attention.

The Great Western Railway Magazine, 1933. London: The Great Western Railway Company, Paddington Station, W.2. 550 pp. Illustrated. 9½ in. × 7¼ in. × 1¼ in. — The staff journal of the Great Western Railway always provides enjoyable reading, and the beautifully-bound volume of the year's monthly issues which we have now received will be given an easily-accessible place on our bookshelf. A perusal of its familiar pages is a reminder of the outstanding G.W.R. events of 1933. The appointment of Mr. H. L. Wilkinson as Superintendent of the Line, following Mr. R. H. Nicholls's retirement; the annual general meeting, the last of those held during the 25 years of Viscount Churchill's chairmanship of the company; the introduction of penny-a-mile fares; the first "Holiday Haunts" express; Britain's first railway-operated air service, inaugurated between Cardiff and Plymouth on April 12; the first show train; alterations at Paddington; and large new orders for rolling stock are but a few of the more memorable events of a year which was conspicuous for the number of successful developments in previously unexplored directions.

Armstrong Whitworth Record.—The latest issue of the Armstrong Whitworth Record is an admirable example of what such a publication should be. Printed on highly surfaced paper and copiously illustrated, it contains 89 pages enclosed within an attractively-designed cover. The subject-matter deals, by means of authoritative articles, with Armstrong Whitworth Diesel Traction Developments, Pioneer Vessels from the Walker Shipyard, Modern Trends in Marine Propulsion, Armstrong Whitworth Pneumatic Tools, Railways in Miniature, Olympia 1933, New Machine Tools, Armstrong Saurer Progress, and other topics. Engineers interested in steam, electric, and diesel traction will find much of value to them in this publication, as will also those concerned w th road traction and marine propulsion. The metallurgist will find on pages 23-27 a most interesting article on special cast iron for modern engineering requirements, while the subject of machine tools, both fixed and portable, is given adequate attention. The products of the Armstrong Whitworth group to-day cover a wide range and this volume successfully portrays each of them in turn.

THE SCRAP HEAP

PINK RHUBARB

Rhubarb expresses are running again. Forty tons of forced rhubarb for the London markets are arriving at King's Cross goods station each morning a few minutes after 2 o'clock, and the peak of the early rhubarb season is expected to be reached in a fortnight's time, when 60 tons per night will pass from Leeds. Express freight services are arranged for this unusual commodity, the 200 miles from the West Riding being covered at express passenger speeds. There are more than 3,000 acres of land within a ten-mile radius of Leeds devoted to the growth of forced rhubarb which is being developed on scientific lines.

* * *

Do not jump from a moving train unless you want your meals in hospital. —*Notice at Port Sunlight station.*

* * *

Railway lines lengthen approximately fifty yards on one hundred miles of line in the summer, owing to expansion. It is only fair to state that the companies make no extra charge for the longer ride.—*" Punch."*

* * *

The Southern Railway's popular dockyard trips to Southampton have caught the lynx eye of the Custom and Excise, who actually charge " entertainment " tax on admission to the new graving dock!—*From the " Star."*

* * *

The dome of the Winnipeg railway station of the Canadian National Railways has been covered with 10,000 square feet of copper capping. The copper used weighs 16 ounces to the square foot, bringing the total weight of the new cap to nearly five tons. It is considered that this copper covering will last for 50 years.

* * *

THE FOG AND THE ROADS

Over a very wide area traffic was seriously disorganised, and in some districts road services were for a time suspended. Often tramway lines offered the only visible guides, and the tramcars led processions of vehicles along main roads. . . . Although there was no serious hold-up on the railways, trains ran erratically. . . . At one time traffic in Streatham High Road and Balham High Road was at a complete standstill. . . . Nine people were injured when an omnibus on the 68 service and another on the 169 service came into collision in the fog. . . . Nine vehicles came into collision in . . . and two people were injured. Three trams, two private cars, and four commercial cars were involved in the collisions. An omnibus and a motor-lorry came into collision. . . . Many people were knocked down . . . by motor-cars and cyclists. On one occasion 12 people were knocked down by one pedal cyclist, who had swerved to avoid an omnibus. Tramcars and omnibuses were led in convoys by their conductors. . . . where five roads meet, squads of police officers with electric lamps piloted vehicles across. Three people were injured when a car and an omnibus came into head-on collision. . . . Seven people were hurt in a collision between an omnibus and a coach.—*From " The Times."*

* * *

L.M.S. " WHIST DRIVE " TRAIN

Prizes of return railway tickets to various points on their system were offered by the London Midland & Scottish Railway Company to the winners in a " whist drive train " which was run to Dumfries on Saturday, January 27. On arrival at Dumfries the passengers had the opportunity of visiting the various places of Burns interest.

* * *

A relief clerk was alone, in charge of a station on a single line in Cornwall in the depths of winter. There was nothing doing. In fact, there was not one passenger, in or out, all day. The business, he reflected, was being run at a dead loss. This would not do. He could not bear it. So, before going off duty, he felt compelled to buy himself a three-ha'penny ticket to the next station—and honour was satisfied.—*From " Over the Points."*

* * *

A STRATEGIC TUBE RAILWAY

A correspondent, writing in *The Daily Telegraph* recently, said: " May I suggest the construction of a strategic tube railway between Dover and London, or at least Dover and Maidstone, by making use of the chalk downs which conveniently run in the right direction. With stations at intervals, such a line would open up entirely fresh parts of Kent, and would also serve to provide an emergency railway completely protected from aircraft attack."

* * *

THE UNIVERSAL PROVIDERS

" You marry, we do the rest," the familiar advertisement of the hire-purchase furnishers, seems to have been adopted by the Great Western Railway Company. Such unusual jobs as mowing the lawn, digging the potatoes, delivering the coal, and caring for animal pets have been performed by them when families are on the move. But now, I am informed, they have gone one better by undertaking to engage a charwoman to get the new house in trim for the incoming tenants before the furniture arrives by road or rail. The enterprise deserves to succeed if only for its novelty.—*Peter Simple in " The Morning Post."*

* * *

We reproduce in the next column the six simple and striking bulls-eye symbols which have been standardised by the London Passenger Transport Board for its whole enterprise and for its five main operating sections

OVERSEAS RAILWAY AFFAIRS

(*From our special correspondents*)

South African operating results and lubricating economies —South American summer excursions—British materials specified in New Zealand—French West African lines—Pooling Spanish resources—Census of production in India —Swiss railway finances

SOUTH AFRICA

General Manager's Annual Report, and After

The result of working the combined railways, harbours and steamship services during the year 1932-33 was a deficit of £1,193,868, which, added to the deficit carried forward at the end of the previous financial year of £2,498,209, brought the accumulated deficit at March 31, 1933, up to £3,692,077. The working results since that date reflect considerable improvement and for the last five months of the current financial year (1933-34) reveal a net surplus of £316,380 compared with a net deficit of £892,870 for the corresponding period of last year or a net improvement of £1,209,250. The improvement is largely due to the mining development on the Witwatersrand. Mr. Watermeyer, in his annual report for 1932-33, states, however, that there is, as yet, no cause for undue optimism since there can be no claim to permanent prosperity until the farming community has recovered from the ill effects of the unprecedented drought.

The total capital expended on railways, harbours and steamships at the end of the year under review amounted to £165,463,771, of which sum £148,101,387 has been expended on railways (open lines) and £16,986,000 on harbours. At March 31, 1933, there were in service 2,136 steam locomotives, 95 electric locomotives, 3,891 coaching stock and 39,893 goods stock. No new locomotives were placed in service nor were any on order at the close of the year.

Lubrication of Locomotives and Rolling Stock

Last year's report drew attention to the Administration's decision to abandon the practice of over twenty years' standing whereby the lubrication of locomotives and rolling stock was carried out under contract on a "guaranteed mileage" basis, and instead to purchase oil, in future, on a gallonage basis, full responsibility for the efficient lubrication of locomotives and rolling stock being undertaken departmentally by the Chief Mechanical Engineer. The change, Mr. Watermeyer shows, is fully justified by the results obtained to date, the cost of lubrication during 1932-33 compared with 1931-32 being less by £11,716 or 22·31 per cent. The figures include the cost of wool waste as well as the cost of lubricating oils, but, according to statistics, practically the whole of the saving was effected in the cost of the oils.

Plants for the reclamation of oil and waste, used in the lubrication of locomotives and rolling stock, have been in operation for a number of years. Recently, an improved type of plant was introduced providing for a higher percentage of recovery of good waste and oil. The new process is that the oil-saturated waste drawn from axleboxes is passed through a tank of hot oil, the temperature of which is 180 deg. to 200 deg. F. It is washed for 10 or 15 minutes and then transferred to a draining tank, after which it is passed over a grading board and is then ready for re-issue. The oil recovered is passed through a filtering process and subsequently re-issued for ordinary lubricating purposes. The results obtained from the improved reclamation plants are approximately: Materials recovered, waste 72 per cent., oil 19 per cent., sludge (discarded) 6 and short waste (discarded) 3 per cent. Plants have been installed at 23 running depôts and workshops throughout the Union and have resulted in considerable savings by reducing the quantities of new oil and waste issued for soaking purposes.

Road versus Rail Transport

On the South African Railways the average cost, including interest, of conveying freight is less than 0·9d. per ton-mile. The railways work 9,928 route miles of road motor services and the average cost of operating these services is approximately 4d. per freight ton-mile. Thus the average cost of road transport is more than four times as great as by rail.

Auditor-General's Report

Dealing with the audited figures of the working of the South African Railways and Harbours during the past financial year, the Auditor-General draws attention to the favourable operating ratio, which during the year decreased by 4·26 per cent. This is accounted for by the special economies effected in expenditure, which, as compared with 1931-32, decreased by £2,013,063, while the fall in revenue amounted to only £1,419,781. Dealing with road motor services, the Auditor-General states that out of a total of 109 area services, 60 showed a profit during the year aggregating £32,900, the remaining 49 having been operated at a loss of £15,250, while a further loss was incurred on miscellaneous account. On dining car services he records a loss of £10,561 as compared with £9,133 during the previous year. Grain elevators showed a year's loss on working of £9,391.

ARGENTINA

Supplementary Port Works

The Argentine Ministry of Public Works has authorised the Department of Navigation and Ports to spend the sum of $1,835,476 paper on various supplementary works at the New Port of Buenos Aires, and a further $500,000 paper on renewals to the Riachuelo wharves at the South Dock; while $300,000 paper have been allocated for the construction of an ante-port. The Government has approved a proposal by the navigation and port authorities for a scheme of extensions to the Port of Ramallo on the Paraná River, served by the Central Argentine Railway, at an estimated cost of $104,350 paper; and the execution of similar works at Bahia Blanca (B.A.G.S.R.) at the cost of, approximately, $150,000 paper. The Department of Navigation and Ports has approved the construction of a high level railway at the port of Concepción del Uruguay on the Entre Rios Railways. The cost of the work, which includes considerable extensions to the existing port and the renewal of permanent way material, is estimated at $44,000 paper. A similar scheme of extensions to Gualeguaychu, another river port served by the Entre Rios Railways, at an estimated cost of $182,000 paper, has also been approved.

Summer Train Services

All the Argentine railways are making special efforts to cater for the summer holiday traffic. The depreciation of the peso is likely to compel many people, who have hitherto gone to Europe, to spend their holidays in Argentina, and the attractive facilities provided by the railways will add to the inducement. The B.A. & Pacific Railway, in combination with the Transandine Railway, is organising special excursions to Chile at exceptionally low fares. The first-class return fare from Buenos Aires to Santiago or Valparaiso, inclusive of beds and meals on the train and eight days' stay at an hotel de luxe in either of these cities, is only $310·00 paper (about £16). The Central Argentine Railway, in addition to running well-filled special excursions to the Cordoba hills during the Christmas and New Year holidays, has supplemented its daily express service to Cordoba by an additional night train from Buenos Aires, which is proving a very popular innovation. The

same company recently ran a special excursion, in connection with the school summer vacations, from Tucumán, Salta and Jujuy, in conjunction with the State lines. So heavy was the traffic that five trains had to be run, the total number of passengers being well over 1,000. In addition to preparing to cope with the usual heavy summer passenger movement to South Atlantic resorts, the B.A.G.S. Railway is putting into force, from the middle of January, an improved and accelerated service to the Southern Andine lakes in co-operation with the State Railways. An express, with through sleeping coaches, will run twice a week in both directions between Buenos Aires and Los Juncos, the railhead of the State line in course of construction by the B.A.G.S.R., some 20 miles south of Pilcanyeu, the southern terminus of the State Railways; the remainder of the trip to Bariloche at the head of Lake Nahuel Huapi (about 25 miles) being covered by motor-car. It is expected that by next summer the railway will be completed right through to Bariloche. The B.A. Western Railway is also offering facilities for all-in rail and hotel tickets to Lake Carhue, a well-known spa. The State Railways are also organising special excursions at very cheap rates through the Northern Provinces. The tickets, which are available for return within 45 days, and will be issued until the end of February, allow the traveller considerable freedom of movement with respect to break of journey and choice of itinerary. The price is $100·00 paper for adults and $50·00 for children, an additional charge of $2·00 per night being made for bed tickets.

The B.A. Midland Railway and the Argentine National Railway Pension Fund

Some time ago the authorities of the National Railway Pension Fund claimed from the B.A. Midland Railway (now incorporated in the B.A. Western) payment of certain contributions corresponding to the salaries of various employees, dating back to July, 1919. The company paid the sums demanded, but appealed to the courts for the return of a portion of the money on the grounds that the Midland Railway was not brought under the operation of the Pension Law until February, 1921. The judge decided in favour of the pension authorities, and this ruling was subsequently confirmed by the Federal Court. The company thereupon appealed to the Supreme Court, which has now declared that Article 15 of the Pension Law (No. 10650) laying down the principle that " the contributions of the incorporated companies shall be liquidated as from the date of the passing of said Law is unconstitutional, and that the Midland Railway is therefore entitled to the return of the excess amount paid into the fund corresponding to the period (July, 1919, to February, 1921) prior to the company's incorporation in the Law. The fact that all the provincial railways were not brought under the scope of the National Pension Law simultaneously has not only resulted in considerable loss of revenue by the fund, but has caused some misunderstanding in regard to the extent of their obligations, and the definite ruling now given by the National Supreme Court makes the matter clear.

CHILE

Reduced Speeds on Chilean State Railways

According to information from Santiago de Chile, the new summer timetable of the Chilean State Railways provides for reduced speeds on some of the lines, more particularly between Santiago and Valparaiso, in order to minimise the oscillation when the numerous curves are negotiated at high speeds. The railway authorities state that the speeds previously maintained are in no way dangerous, and the lower speeds have been adopted purely with a view to the comfort of passengers. Since December 21, the time of the run between Santiago and Valparaiso has been extended from 2 hours 58 mins. to 3 hours 8 mins. It is stated that proportional reductions in speed will be made on the long-distance runs to the south, as, apart from the reason given above, lower speeds will be less severe on the permanent way.

NEW ZEALAND

The Empire Spirit

The New Zealand Government Railways Board has decided that all its printing requirements should be on paper of British manufacture. The contract just let for over a third of a million pounds to construct the new station at Wellington requires that all imported material shall be of British origin and manufacture. The Fletcher Construction Company, the contractor, has now placed sub-contracts for the steel members with Dorman Long & Company, England, and the Steel Company of Scotland. The concrete reinforcing rods will all be of British manufacture. Wire, of which a large quantity will be used for rod tying and box work, will come from Thomas Firth & John Brown Limited.

Further Financial Improvement

Evidence continues to accumulate of the success achieved in New Zealand by placing the Government Railways under the control of an independent non-political Board. The latest figures, to November 11, show an increase of £33,971 in gross revenue for the four-weekly period, as compared with the corresponding period of the previous financial year. Operating expenditure increased by £1,848, leaving an increase in net revenue of £32,093. For the 32-week period of the financial year, from April 1 to November 11, the gross revenue shows an increase of £51,912 and expenditure a decrease of £45,700, leaving a net increase in revenue for that period of £97,612 as compared with 1932-33.

FRENCH WEST AFRICA

The State Railway System

Probably few railway systems are less known to the average reader than that of French West Africa. Yet the total length of that system is over 2,200 miles, now operated entirely by the Government Administration. Most of the constituent lines have comparatively recently been retroceded to the State, and during the last two years the following additions have been made to the system:—

The Louga-Linguère branch of the Dakar-Saint-Louis line, 80 miles, has been completed; the Diourbel-Touba branch of the Thiés-Niger—the longest constituent railway, 800 miles—28½ miles in length; a 75-mile extension of the Central Dahomey line from Savé to Tchaoron, opened last May, leaving 245 more miles to complete the line; and finally there are 129 miles in the form of an extension of the Ivory Coast line from Terkessédougon to Bobo-Dioulasso, which either just have been or are just about to be completed. This latter line is eventually to join up with the Thiés-Niger section. The Conakry-Niger line maintains motor-lorry services with a route mileage of over 400 miles. The Report on Economic Conditions in French West Africa, 1931-33, just published by the Department of Overseas Trade, from which the above particulars are culled, shows that total traffic receipts in 1933 were 89,160,000 fr. against a total expenditure of 100,981,000 fr.

SPAIN

The Railway Problem

Once again the railways have been promised a solution of the railway problem. It certainly seems impossible that the Government should much longer remain inactive in face of the avalanche of appeals and petitions it has received since coming into office. The political uncertainty has prevented any action being taken in recent months, but with the stability which the present Government appears to offer, all interests concerned have renewed their efforts to obtain some form of solution to this 20-year old problem. The Prime Minister and the Minister of Public Works have received innumerable visits, memorials and petitions from representatives of the railways, banking interests, railway share and debenture holders, &c., urging that steps be taken immediately in order to avoid a national economic disaster.

The Minister of Public Works, who held the same portfolio during the short term of office of the late Government, has now carried into effect a proposal which he made in September last,

and in the official Gazette of January 8 there appears a Ministerial Order appointing the members of the commission which is to study the question. The proposal of the Minister was described in THE RAILWAY GAZETTE of November 10, and it will be remembered that this commission was to be composed of representatives of the State, the railways, the users or trade interests, the employees and road transport, and its mission is to " study the present position of the railways and propose measures for the co-ordination of road and rail transport." It may be remembered that the proposal of the Minister met with considerable opposition from the railway interests. Rumour has it that the opinion of the Minister is that the only solution lies in an increase of tariffs.

To Reduce Working Costs

The Northern and M.Z.A. Railways have recently agreed upon a joint plan of economies, under which it is hoped to reduce working costs considerably, by securing the greater mobility of rolling stock, resulting at the same time in an increase in the carrying capacity of their lines. The agreement covers three principal measures: (1) The pooling of rolling stock, (2) the abolition of junctions, and (3) the unification of tariffs. The first of these proposals has already been put into effect, with the result that a considerable saving has been obtained by the elimination of a large amount of empty running and tranship work at junctions. This arrangement of common user of wagons, and the abolition of the junctions, which it is proposed to carry out, will do much to speed up the service, and liberate wagons for paying traffic at a greatly reduced working cost. A central office has been established to control the distribution. The question of tariffs is now being carefully studied, with a view to readjustment, and this, while eliminating uneconomic competition as much as possible, will not be prejudicial to trade in the present moments of depression.

RHODESIA

Frozen Meat Traffic to the Coast

Up to the end of November last, consignments of frozen meat from Bulawayo for Durban or East London were shipped in Lightfoot-Stone mechanical refrigerator vans. As, however, the traffic was then expanding and there were only nine of these vans available, it was decided to experiment with ordinary South African Railways' vans with overhead ice bunkers. The first experimental consignment was loaded into three vans at a temperature of 17° F., and at the end of its 1,200-mile journey to the coast the temperature had risen only to from 23° to 26°. The result is considered fairly satisfactory, as it proves that this frozen meat traffic can be railed successfully in vans hitherto used only for chilled meat.

Thanks to more favourable rates of exchange holiday traffic between Rhodesia and the Union has revived this summer and a rush in the middle of December caused the ten trains in or out of Bulawayo on a Wednesday to be increased by 50 per cent. on December 13. On that day 847 European passengers left for the Union out of 1,468 dealt with in all at Bulawayo.

INDIA

Economic Planning in India

An economic inquiry of far-reaching importance has been instituted by the Government of India with special reference to the need for the establishment of a bureau for the collection and interpretation of commercial statistical data. Two British experts will be associated with three Indian economists in carrying out the investigations, the exact lines of which will be settled after consultation with the experts. The work at present visualised consists of (1) a preliminary survey of the present economic conditions; (2) a survey of the existing statistical organisation in India with a view to placing this department in a position to keep the Government and the public acquainted with the main indices of national economic life; and (3) a thorough and complete economic census on the lines of the census of production in Great Britain. Indian railways will be greatly interested in this inquiry, particularly in the census of production. If this census of production is amplified by reliable data about consumption, the railways will be in a position to form a more or less accurate estimate for budgetary purposes of the volume of traffic that has to be moved annually. At present the receipts side of the railway budget is framed wholly on empirical methods.

Railway Fares in India

The experience of the Madras & Southern Mahratta Railway in the matter of arresting the decline of revenue from passenger traffic provides interesting reading. There was a decrease of nearly 10 per cent. in the number of passengers travelling over this railway in 1931-32. As the continued fall in commodity prices pointed to a lower spending power of the ryots and consequently a further decline in passenger traffic, the railway administration decided to enhance the fares from April, 1932, in order to check the fall of revenue. As a result, although there was a further decrease of over 2½ millions in the number of passengers travelling in 1932-33, the revenue from this source did not suffer. In the case of third-class passengers there was actually an improvement in the receipts amounting to over Rs. 6 lakhs. This experience, however, is opposed to the results on many other railways in this country, where the introduction of cheap single and return-journey fares in particular areas has produced substantial increase in the number of passengers, attended by no small improvement in receipts. In addition to the usual concessions granted by all railways for travel during the Christmas holidays, the Eastern Bengal Railway, in conjunction with the Assam-Bengal administration, this year introduced a circular tour from Calcutta to Pandu via Chandpur and the A.-B.R. hill section and back by the direct E.B.R. route. The tour was restricted to first and second-class passengers with servants in the third class and permitted break of journey.

Indian Railway Finance

A gratifying feature of railway working during the present financial year is the steady advance in the volume of goods movement. It is now practically certain that budget anticipations in regard to railway earnings will be realised, although so far, there has been a slight decline in passenger traffic. The opening of the Ava Bridge in Burma on January 2 marks the completion of the last major capital undertaking on hand and it remains to be seen whether the opportunity offered by the easy monetary conditions now obtaining will be seized by the Indian railways to embark on new construction and capital works.

SWITZERLAND

Federal Railway Finances

The Federal Council has given the Federal Railways sanction to issue a loan amounting to 100,000,000 fr. for the purpose of covering treasury requirements. This loan will bear interest at 4 per cent. and will be issued at 99 per cent., plus 60 centimes for Federal Stamp Duty. It is to be redeemable at 15 years, the Federal Railways reserving to themselves the right of optional redemption after twelve years.

According to figures published by the Federal Statistical Office, the gross earnings as compared with the corresponding period of 1932 of all Swiss Railways during the first nine months of 1933 were as follow:—

	Jan.-Sept. (in million fr.) 1932	1933
Passenger traffic	176·1	168·8
Goods traffic	165·8	158·9
Miscellaneous receipts ..	9·8	9·4
Total	351·7	337·1

CHINA

Railway Progress

A consignment of 80 coaches ordered by the Lung-Hai Railway is reported to have arrived from England. Meanwhile the survey of the 400-km. Kiangpu-Tancheng line is now about completed: the formation is expected to be finished by the end of this year and the line opened in 1936. The estimated cost is $50,000,000, says the *Chinese Economic Bulletin*.

CAB SIGNALLING OR A.T.C.?

Discussion on the relative merits of the simple repetition of signals on locomotives and the addition of automatic brake application

AT the International Railway Congress at Cairo in January, 1933, Question IX: "Automatic train control and train stop. Track equipment. Locomotive fittings. Methods used for repeating signals on the locomotives. Devices intended to ensure the attention of the drivers," gave rise to an important discussion which has now been published in full by the International Railway Congress Association. The subject is specially topical at the moment because of the circumstances of the unfortunate accident at Lagny on the Eastern Railway of France on December 23. We reproduce below extracts of the discussion which took place under the very able presidency of Mr. Margot, late General Manager of the P.L.M. Railway.

Lieut.-Colonel Mount, Minister of Transport, Great Britain.—I am glad to have this opportunity of complimenting the writers on their very interesting reports, and also the Special Reporter on his able summary. I think the whole of the ground has been fully covered. I am generally in accord with the summary of the report, and have little to add. I should like to say that I am not representing Mr. Crook of the Great Western Railway, who is unable to attend, but I represent the Ministry of Transport. I was a member of a committee which reported to the Minister on this subject in 1930, when recommendations were made to adopt a system of automatic train control (this Committee was known as the Automatic Train Control Committee) like that on the Great Western Railway, and to experiment further with the Strowgee-Hudd inductive system. The report is of some interest as it introduces the terms "direct" and "indirect" with regard to safety measures generally. The former (direct measures) includes automatic train control and such safeguards as traps, derailers, sand drags, detonator placing equipment, &c.; while the latter (indirect measures) was divided into the following categories: (*a*) visibility from the cab, and the positioning of signals; (*b*) powerful signal lights; and (*c*) signal lever interlocking with relation to block transmission.

A.T.C. on the G.W.R.

The committee expressed a preference for "direct" methods of increasing security and it is of interest to remark that while the Great Western Railway has now equipped some 2,500 engines and 2,200 track-miles at a cost of about £190,000, progress is also being made in various large installations with the "indirect" method by substituting colour-light signals for semaphores. I mention this because, on page 118 of the Special Report,* it is said that "other countries which have little or no experience of accidents due to overrunning of signals naturally view automatic train control with little interest." On the contrary, in spite of their wonderful record of immunity from serious accident, British railways are alive to, and spend large sums upon, still further improving security in various ways. They look on it as a matter of insurance. For instance, the last fatality in a passenger train accident on the Great Western Railway occurred, I think, in 1928, when a workman was killed in a colliers' train collision, while that followed a period of no less than 15 or 16 years of immunity from a fatal accident to a passenger. I would add that only the Southern Railway are mentioned as experimenting with the Strowger-Hudd system, but the London Midland & Scottish are also experimenting with the system.

* Summarised in the Special International Railway Congress Number of THE RAILWAY GAZETTE, December 31, 1932, p. 53.

I am very glad to see the opinion with regard to retention of signals, as I should certainly oppose widespread removal for various reasons, at any rate on main lines operating at high speed.

With regard to the remarks about frost and ice affecting some designs, I presume that the "crocodile" is mainly referred to. I have not heard of any complaints in this respect relative to the Great Western Railway's ramps; nor should I expect it, having regard to the heavy and substantial nature of their equipment, making such definite contact.

I would draw attention to the fact that the Great Western Railway use the "closed circuit" system, whereas I gather that the French crocodile equipment depends upon picking up current from a ramp for producing the "warning" effect, which of course is exactly what the Great Western system avoids.

The last point I would like to mention is that the special report refers to misuse of automatic train control apparatus, and the necessity, in consequence, for recording apparatus. On the Great Western Railway, drivers would, in my opinion, in no circumstances misuse the equipment, as they are only too appreciative of the advantages of its existence.

The President (Mr. Margot).—Colonel Mount has just given us much information on the work done in England; he is in fact in favour of automatic train control, which shows, I think, that there is a question of principle to be cleared up: must we introduce automatic train control or not, seeing that, as the Special Reporter pointed out, there are two quite distinct questions:—

1. The repetition of the fixed signals on the locomotive?
2. The automatic control of the trains?

I think, therefore, that it is in our interest to examine the question of principle before we discuss any question of system or arrangement.

Has anyone anything to say on the question of the principle of automatic train control?

Mr. Duchatel, Eastern Railway of France.—In my opinion, there is a very clear distinction, in principle, between the simple repetition of the signals and the automatic control of the trains. If we consider how a driver should act at the moment he passes a signal not in the off position, we see that there are three things he ought to do:—

1. He should understand quite clearly the indication the signal gives him;
2. He should translate this indication, correctly understood, by thinking out what action he should take on the locomotive.
3. He should carry out this action.

We have, as it were, a play in three acts in a very short time, and if this play in these acts ends sometimes, too frequently alas! in drama, it is because in most cases, if not in all, the first act has been a failure.

The important thing in sighting signals is to perceive the indication given by the signal. Once this indication has been well absorbed, the stop—when a stop is required—is very rarely made badly.

Audible Warning Only Preferred in France

To meet the risk of the signals not being perceived, a real risk, particularly in the case of express trains in bad weather—audible repetition of the signals on the engine is advocated, and in France this audible repetition has been successfully carried out, because we have been careful not to weaken the vigilance of the driver, by recording his alertness and keeping a very close supervision thereon.

Is it necessary not only to repeat the signal, but also to substitute automatic action for that of the driver in

stopping the train? This is a second question which arises after the first, but which is quite distinct from it. Actually it is a question of covering a different risk, that presented by a driver who, having correctly read the indication given him by a signal, does not do exactly what he should after having read the signal indication.

I have already said that this risk was of very little importance. I would go so far as to say that there is almost no risk when the signals have been audibly repeated on the locomotive and the driver has with him a fireman who also hears the warning of a signal overrun in the " on " position, and who can even act for the driver if the latter should fail by any chance, a very remote likelihood.

My conclusion, therefore, is that, in principle, the automatic control of the brake does not provide any appreciable additional safety so as to justify the expenditure involved, in all cases in which the signals are also audibly repeated on the locomotive, and when the driver has a fireman with him, or in those cases when the driver is alone, in which arrangements are made for the head guard to make good any failure of the driver.

I will go still further: I consider that automatic control of the brake on the locomotive—quite separate, I insist, from the repetition of the signals—can only be really effective—supposing it is useful—in quite exceptional cases in which, on the one hand, the spacing of the trains is such that there are always two home signals between two trains and, on the other hand, the distance between two succeeding home signals is not less than the stopping distance of the train for which this distance is greatest.

If these two conditions do in fact occur, it will be appreciated that all that is needed is to arrange for the brakes to be applied automatically the moment the train passes the first home signal at danger that it meets: the train will stop before the second home signal, and consequently before it could overtake the preceding train, and the apparatus will only function—the Special Reporter has shown this quite clearly—in cases in which the driver has really made a mistake.

Difficulties of A.T.C.

If, on the contrary, the two conditions I have just mentioned are not fulfilled, that is to say if there are not two succeeding home signals between two trains following one another, or if the stopping distance between two succeeding signals is not great enough to ensure all trains being brought to a stop, track equipment for automatically applying the brake on the locomotives must be provided before the home signal is reached.

Another difficulty then arises. If on the lines—these are the most numerous I believe—on which the trains following one another either are running at different speeds, or have different brake power and consequently require widely varying distances in which to stop, we wish to stop automatically all the trains before the home signal is reached, the automatic control must act at a sufficient distance so that the train requiring the longest distance in which to stop will stop at the home signal: but then those trains on which the brakes could have been applied later will stop too soon, and this will upset the working seriously with possibilities of greater danger than the risk we want to suppress.

If, on the contrary, to avoid interference with the working, the automatic control, or the track equipment operating it, is installed near the home signal, so that no train will stop too soon, the automatic control has no longer any, or at the best very little, efficacy; it will no longer prevent the home signal being overrun, but will only reduce the distance by which it is overrun, and under such conditions it may be questioned if the result is proportionate to the expenditure involved.

To sum up, I think that under normal railway operating conditions—which interest us directly—that is to say under the conditions in which trains are required to work over the same line at different speeds and under different braking conditions, repetition of the signals on the engine is of great utility, and the automatic control useless.

Mr. Stäckel (Special Reporter).—I think the thesis put forward by Mr. Duchatel, that we could be satisfied with cab signals, deserves our consideration. On the other hand, it must be realised that there are cases in which a physical failure of the driver might have serious consequences. Such cases have been considered sufficiently important by most railway administrations for them to consider it desirable to agree to the very small additional expenditure involved in installing *automatic* control. Mr. Duchatel's theories do not appear to be proved in practical instances of automatic braking. No administration has introduced automatic braking which comes into action at the distant signal. There are, moreover, no installations where the brake is applied too late. This only occurs if the driver neglects to operate the vigilance checking device, or if he continues to run at a dangerous speed. This is the reason why many railways have been led either to provide automatic braking only in case of danger, or to combine automatic braking with audible signals. I do not think that we can decide in principle not to use automatic braking.

Mr. Gresley (London & North Eastern Railway).—With regard to the point raised by Mr. Duchatel on the question of additional cost which would be incurred by making the application of the brakes when the train passes the warning signal, I should like to call attention to the system adopted on the Great Western Railway in England. There would be no additional cost, because the audible indication to the driver is given by the release of air from the brake appliances.

On the question of safety, we, in England, think it very desirable that when the driver passes the distant signal in the warning position, there should be a partial application of the brakes, because if, as Mr. Stäckel says, anything were wrong with the driver, for instance if he were suddenly taken ill, the safety of the train is looked after automatically and the train would be brought to a standstill before reaching the home signal. There does not appear to be any difficulty due to this application of the brakes. The Great Western Railway system has been in existence for several years and we cannot see that the system can in any way produce conditions which are a danger to traffic. Even if fully equipped with vacuum brake or continuous brake, or if only partially fitted with it, the train would be brought to a standstill before the home signal is reached, it might go so far as even to overrun the home signal, but speed would have been so much reduced during the running from the distant to the home signal that this would be all to the good in reducing the consequences of any mistake in obeying signals.

The Swiss Point of View

Mr. Savary (Swiss Federal Railways).—Mr. Duchatel's conclusions tend to oppose audible repetition of the signals to automatic application of the brakes. With Mr. Duchatel I would like to stress the word " audible," because there is absolute interest in having an audible warning whether it be steam or electric traction, because of the many incidents which may arise unexpectedly and distract the attention of the enginemen from observing the signals.

It is almost a retrograde step from the present position of safety on electrified lines, in Switzerland for example, to put the two systems into opposition with one another.

On our electrified lines we have only one man on the footplate, and this is the system of the future, whatever the staff may say for interested reasons. In the case of one-man driving, we use the arrangement known as the " dead man's handle," which implies the control of the physical condition of the driver. an arrangement which can easily be combined with automatic braking.

It is in fact relatively simple, by using an inductive device, to couple this circuit with the signal circuit, these two safety devices making it possible for the track signal to control the braking action and to operate the audible cab signal.

The question of the distance between the signals, raised by Mr. Duchatel, will be completely changed when daylight signals are introduced, because the important distances are not only those between the distant and home signals, but also those between the home signals and the first dangerous point encountered in the stations.

As regards the alertness of the driver, everyone agrees that the safety of the trains ought not to depend alone on the vagaries of an electric current or on the elasticity of a

spring, but on the watchfulness of the driver. Now, this can be checked by enabling the driver to take action between the warning of a signal at danger and the application of the brakes. If the driver allows the brakes to be applied, it shows that he has not been attentive to his signals; in this way his alertness is checked, and in the case in question he will be required to give an explanation. We have therefore a permanent factor of safety.

As regards the cost of installation, our experience in Switzerland, with one-man driving, is that the additional costs are considerably greater. The cost of a set of track inductive equipment we estimate to be 5,000 to 6,000 gold francs; however, this expenditure is quickly economised by saving one man on the footplate of the electric locomotive.

Now, of the two systems—the automatic which checks the alertness of the driver, or the presence of a second man on the electric locomotive—who has nothing to do—I much prefer the first.

This is the reason why I say Mr. Duchatel's conclusions appear to me rather too narrow.

Mr. Duchatel.—The remarks made by Mr. Savary show that I did not expound the problem sufficiently when I first spoke. Actually, I have considered more especially the case of steam lines on which there are two men on the locomotive, or on which, when one man is absent, when there is no longer a fireman, arrangements are made for the guard to take the necessary action in the event of anything untoward happening to the driver.

In addition, there is the case of the electrified lines, on some of which there is only one man on the engine with an automatic stopping device generally known as the " dead man's handle." I willingly admit that in the case of the Swiss Railways—which is quite a special one—if the locomotives are already fitted with the dead man's handle and if it is possible at low cost—I am somewhat sceptical about the figures I have just heard—to complete this arrangement by automatic brake control which will stop the train if the signal is overrun—it may be of value to introduce automatic train control seeing that as the trains generally run at much the same speeds, the conditions of application of automatic control are not very likely to hinder the driver's action.

We have before us a very special case, and probably had I to solve it, my conclusions would be the same as those of Mr. Savary. The case on our lines is entirely different: we have trains running at speeds of 120 km. (75 miles) and others at 30 km. (18·6 miles) an hour.

In a case of this sort, I think that there are difficulties in installing automatic train control which will reduce its efficiency to such an extent that we may assume that, to use a trivial expression, it is not worth one's while.

I would now like to reply to Mr. Gresley and to Mr. Stäckel as to the actual efficacy of the system. The object of installing audible cab signals is to do away or reduce as far as possible an actual, great, and serious risk, that of non-perception of signal indications.

Signals Missed by Enginemen

I believe it is an indisputable fact, and one which probably occurs in the same way on all railways, that some signals are either not noticed or are badly sighted by the driver. When this occurs, the consequences can be very unfortunate. Most serious accidents are due to this cause. When the signal has been correctly observed, it is extremely rare for the driver not to comply with its indication in a proper manner.

Now, the automatic control of the brake equipment on the locomotive superimposed on audible cab signals can only effectively operate to minimise this second and very slight risk. In our case, were we to wish to add this automatic control of the train brakes to the signal repetition already fitted, the cost could be very heavy. Our equipment would have to be modified completely and the further expenditure would be much the same as that we have already incurred. With what object? To cover an almost non-existent danger! This is why I have come to the conclusion that on our railways automatic train control is not of any value.

In addition, I would like to add, stressing the point once again, that not only is automatic train control not of interest because the risk is small, but that it is impracticable as if installed so as to overcome the danger in question, other drawbacks would result.

Once again I would like to insist on the above point, because there are, I think, but two ways of working: either to stop all trains before the home signals, those running at 120 km. an hour and those running at 30 km., which involves stopping the slowest and best braked prematurely, or not to stop any train too soon, which would involve allowing the fastest and worst braked trains to run past the home signals. In both cases the result would be unsatisfactory.

The German A.T.C. System

Mr. Stäckel.—I reply to Mr. Duchatel's remarks, I would like to say something more about the German equipment. We do not wish to give the driver audible signals because we are afraid that it might make him less alert. I know that this is done in France because the action taken by the driver is closely checked by means of recording devices. In Germany we have not introduced any such close check as it means a considerable expenditure and because we felt it unnecessary to remind the driver of his duty. We arranged our train control (Zugbeeinflussung) in such a way that it only acted at the end of a certain time interval after the train passed the distant signal, and then only if the driver was not paying attention, that is to say had not made use of the vigilance control device. Now, as a result of his failure, the driver has already lost part of the allowed braking distance, we felt we could not be satisfied by an audible signal but must cause the brake to be applied, because we could lose no more time in stopping the train. This is how we were led to adopt automatic braking.

Mr. Gresley.—I would like to mention that the only railway in England that has automatic train control in extensive use is the Great Western Railway; on the London & North Eastern Railway a section of line is equipped with another form of automatic train control.

The President Sums Up

The President.—To sum up, the result of a very interesting discussion is that we have before us opinions which I do not say are contradictory, but which are not unanimous.

Seeing that we are dealing with a question of safety and consequently with a delicate matter, I think we ought to take our time in drawing up summaries which, whilst not too vague, will allow each of us to retain or modify his view of the matter according to circumstances and the tests which would be carried out.

We have, on the one hand, the very clear thesis of the Special Reporter speaking in the name of the German State Railway, which went straight over to automatic train control without audible cab signals and without any very close check on the driver's vigilance.

On the other hand, we have the directly opposite opinion, that of Mr. Duchatel, who considers that the audible cab signal is the first thing to be provided. He has shown that he looks upon automatic braking as an addition, the effectiveness of which he questions, and he has shown that the installation of such equipment requires very careful consideration on account of the expenditure involved. His opinion is that this automatic braking is not able to add appreciably to safety.

There is then the English method, which consists of audible signals completed by automatic control. Owing to the repeating system used—if I have properly understood it—this automatic control can be added without appreciable expenditure and readily. Mr. Gresley has said that during a a long experience of this method no drawbacks have resulted.

We have before us Mr. Savary's statement, which Mr. Duchatel recognises to be a particular case, and one which has given every satisfaction.

We said at the start that the summaries of the Special Reporter were only a *résumé*, though a very complete one, and that the summaries* should result from the discussions.

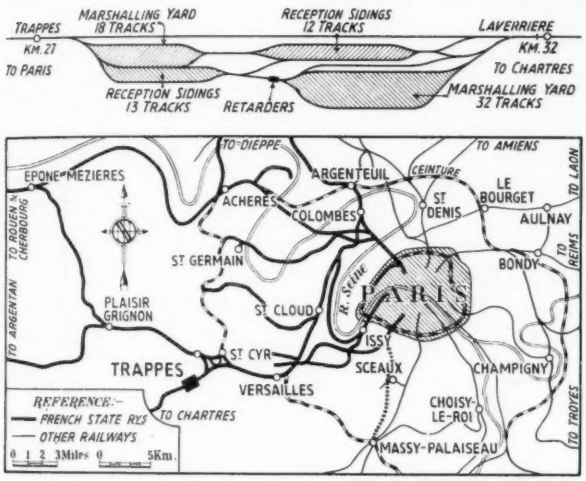
[We refer to this subject editorially on page 169.—ED. *R.G.*]

* The summary as finally adopted was given in THE RAILWAY GAZETTE of February 17, 1933, page 224.

NEW METHODS OF WORKING MARSHALLING YARDS

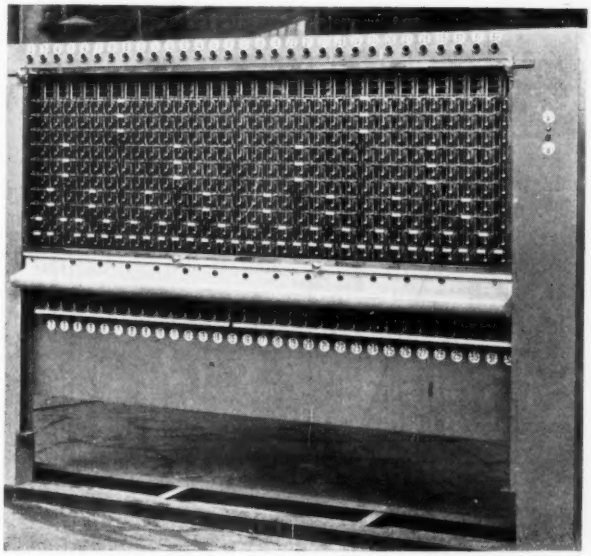
An ingenious automatic control frame at the new Trappes hump yard, French State Railways

THE design, equipment and operation of marshalling yards have attracted a great deal of attention since the war on account of the important part they play in reducing the costs of transport by rail and in speeding up freight services. Gravity shunting was, of course, well known previously, and the sidings at Edge Hill, Liverpool, for instance, had been worked for many years with the aid of special signalling and point working



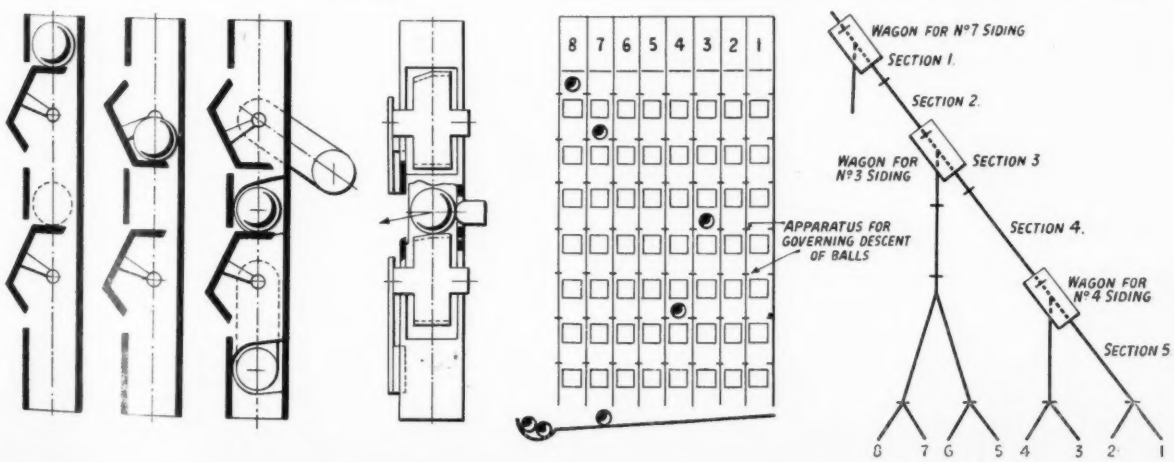
Sketch map showing position of Trappes and diagram of whole concentration yard

arrangements. With the introduction of power signalling much more rapid working was made possible. Several yards at home and abroad were fitted at first with comparatively simple control methods, the old mechanical signalling being merely replaced by direct power operation, with individual working of each pair of points by the signalman. Although this work was more rapid and his labour was lightened, he had still to watch the wagons on the move with great care and manipulate the many points for each one separately as it progressed.



Wagon movement control apparatus

Not long before the war, and following the successful introduction of certain route-lever type power frames on the Continent, electrical methods were developed and applied at Charleville, in France, and Herne, in Germany, for the automatic operation of the points as the wagons travelled down from the hump, the reversal of the points, taking place just before the wagon reached them. Short track circuits, or in some cases treadle contacts, were used to enable the wagons to control the progressive action of the cabin apparatus and hence of the points. Since the war different systems of rail brakes have been evolved, with the object of obtaining a maximum vehicle running speed and, at the same time, directing them to their respective sidings without damage to those already standing there and without the use of hand braking with its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APPARATUS FOR GOVERNING DESCENT OF BALLS
WAGON FOR N°7 SIDING
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WAGON FOR N°4 SIDING
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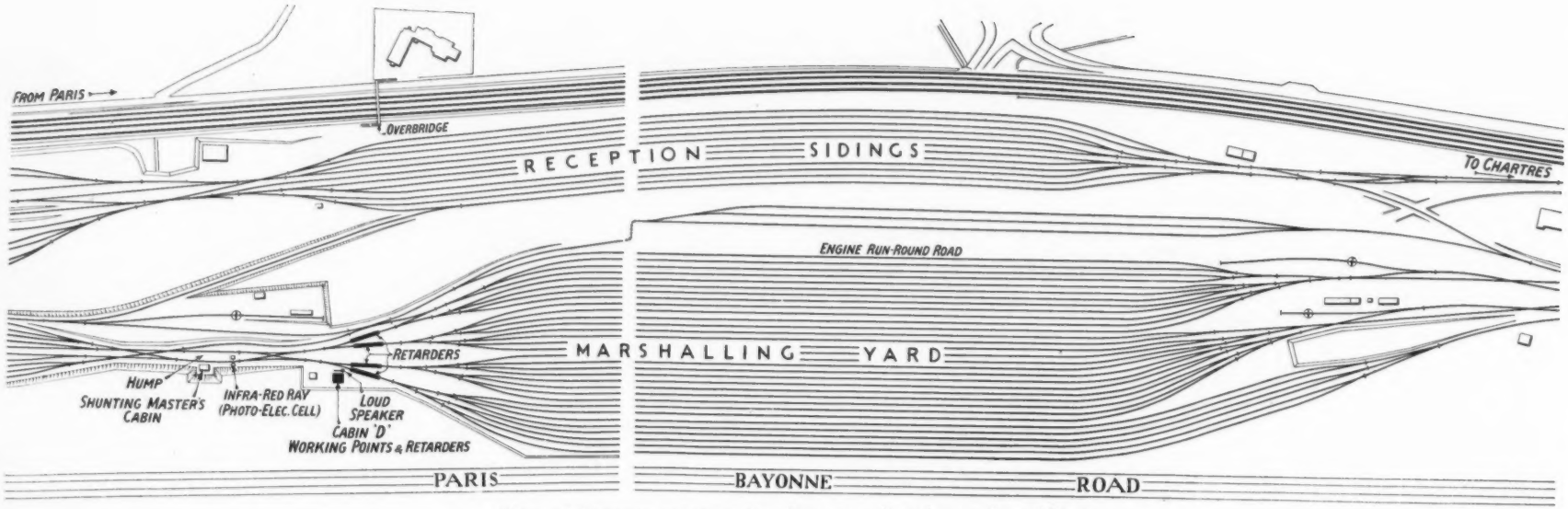
Diagrams showing apparatus controlling movements of wagons from hump into grid



Plan of Trappes concentration hump yard and reception sidings

General view of marshalling yard from near hump: reception sidings on left

Three views of Frölich hydraulically-operated retarders, or rail brakes, on four leading-off lines from hump

Wagons passing over hump and about to pass infra-red ray apparatus

Leading-off lines and Cabin D controlling points and retarders. Infra-red ray apparatus in foreground

attendant risks. On the Continent and in America an immense amount of detailed investigation and study has been undertaken, resulting in the production of numerous interesting devices by inventors and manufacturers.

The Trappes Marshalling Yard

One of the most interesting of the recent developments in this field is the method of automatically controlling the position of the various points in the new yard at Trappes, French State Railways. This yard is situated some 27 km. from Paris on the main route to Chartres, Le Mans, Brest, Nantes, La Rochelle and Bordeaux, and is at a point where, by means of the Grande Ceinture line, these routes are connected with the Cherbourg and Havre lines and the other French railway systems. Opened for service in January last, the yard has already given proof of its usefulness and has enabled many economies to be realised. The adjacent yard of Versailles Matelots has been set free for other purposes, the marshalling hours have been reduced from eight to three daily, the staff from 500 to 400 men, and the engine hours for shunting have correspondingly fallen.

The layout of the yard was specially planned to occupy the shortest possible overall length for a given siding accommodation. It has four leading-off lines, each equipped with Frölich hydraulically operated retarders, or rail brakes, as used in the up yard at Whitemoor, L.N.E.R. These lines feed 31 sidings. There are two humps, the higher always being used in connection with the retarders. The State Railways have equipped, or will equip other yards with Frölich retarders, or with brakes of another type now being tested, or with the Deloison type as already in use on the Etat, the Nord, the Est, the Alsace-Lorraine systems and in the siding at Whitemoor on the up side, which deals especially with wagons having studded wheels. The latter type was described in these columns on October 8, 1926, and March 1, 1929, as well as in *The Railway Engineer* for March, 1930, and a set was installed in the up yard at Whitemoor, L.N.E.R., in 1929.

In the apparatus used at Trappes, represented diagrammatically herewith, the idea is to produce a mechanical equivalent to a man running down ahead of each wagon to set the points for it. It consists of a case containing a set of vertical tubes equal in number to the sidings concerned, and divided horizontally in stages which correspond with the points, or groups of points, as the case may be. These stages in the tubes are constituted by trap mechanisms placed inside them and operated by electro-magnets connected to the insulated sections at and between each pair of points, so as to permit a steel ball to descend in the tube, stage by stage. A supply of balls is contained in the upper part of the apparatus. Contacts controlling the position of the points are arranged so as to be operated by the presence of a ball at the stage corresponding to such points in the route of a given wagon. For example, in tube No. 3 in the diagram, there is a ball waiting to pass to the stage corresponding to the points over which the preceding wagon is still moving. It is not free to do so until such wagon has cleared those points, when it will be allowed to fall and will then close the contacts to reverse the points for track 3 in time for the following wagon.

The balls are liberated in the first instance by the operation of a button by the man at the hump as he sees to which track the vehicle has to be sent, but the action does not definitely commence until the wagon intercepts an infra-red ray acting on a special apparatus which takes the place of a track circuit. Then the ball descends, step by step, as the wagon moves, going ahead of it like the imaginary pointsman, provided that the next stage in the apparatus is free at the instant required. In consequence, should one vehicle overtake another, the corresponding ball does what the pointsman would do, namely, abandon the attempt to set the points for the wagon and allow it to follow the first wagon even if it be into a wrong line. In the new machine the ball corresponding to the second, or overtaking, vehicle could not descend to the stage concerned, since the overtaken vehicle, being still on the track circuit ahead, would prevent the trap mechanism from releasing it. The ball thus remains imprisoned in the apparatus, but the analogy with the pointsman still holds good. For he would necessarily have to leave the yard and return to the hump to deal with another wagon in due course. This is what the ball does. Directly another ball is ready to come down to the level of the imprisoned one a special discharge trap is operated, throwing it out into a supplementary tube, whence it falls into a receptacle corresponding to a line for wrongly sorted wagons. After leaving the final stage in the machine, all the balls are collected and used over again. The practical effect of this ingenious device, which has been invented by M. Robert Lévi, Assistant Permanent Way Engineer, French State Railways, is that the shunter on the hump, by pressing a track button, can liberate a mechanical "shunter," in the form of a steel ball, to accompany each wagon on its way to its siding and set the path for it. The insulated sections at Trappes vary from 12 to 20 metres in length, according to their position in the yard. A pair of points cannot in any circumstances be operated while its protection track rail is occupied by a pair of wheels.

It is understood that the results obtained with the apparatus have been so satisfactory that three new yards on the State system will also be fitted with it. It certainly constitutes one of the most interesting devices among the numerous inventions in this field and possesses the merit of simplicity and, it would seem, of being easily maintained.

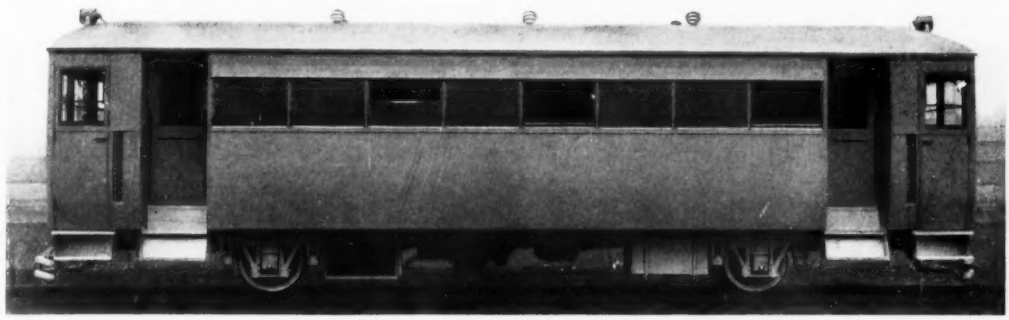
The apparatus has been supplied by the Aster Company, signalling engineers of Paris, and Tyer & Co. Ltd., of Dalston, London, E.8, have the sole manufacturing rights in this country.

Aluminium Bridge Construction

What is probably the first experiment in the use of aluminium alloy for bridge construction is described in a recent issue of our American contemporary the *Engineering News-Record*. At Pittsburgh, Pa., U.S.A., the principal crossing of the Monongahela river is by Smithfield Street bridge, which was opened in 1882, and carries both road and street railway traffic. Examination of the bridge in 1932 showed that extensive repairs to the bridge-floor had become necessary, and attention was directed to a new material—structural aluminium alloy—with characteristics equal to those of structural steel, but 65 per cent. lighter in weight, which it was decided to use for the purpose. The design of the new floor was based on an alloy known as 17ST, having an ultimate strength of 25·9 tons per sq. in., and a yield point of 15·6 tons, with 20 per cent. extension in 2 in.; but a new alloy, 27ST, was finally adopted, with superior resistance to corrosion, whose ultimate strength was 26·8 tons per sq. in. with the high yield point of 22·3 tons, 12 per cent. extension, and a Brinell hardness of 118. In general, the design of the floor-beams and stringers is similar to that of steel members, and hot-driven steel rivets were used. By reason of the reduction in the weight of the bridge floor, which amounted in all to 670 tons, or almost exactly 1 ton per lineal foot of the bridge, it has been found possible to authorise an increase in the maximum weight of four-wheeled vehicles passing over the bridge from 11½ to 18 tons each.

LIGHT ALL-METAL RAILCAR FOR INDIA

A petrol-engined gear-driven railcar built by the Birmingham Railway Carriage & Wagon Co. Ltd. for the Junagad State Railways



FOR the metre-gauge Junagad State Railways the four-wheeled railcar illustrated above has been built by the Birmingham Railway Carriage & Wagon Co. Ltd., of Smethwick. It is notable for its low tare weight per passenger, which works out at only 2·85 cwt., the total weight in running order, including 4 cwt. 2 qr. of fuel, water and oil, being 7 tons 14 cwt. 1 qr. for 54 passengers. Of these, 50 natives are accommodated in the main saloon, and two upper class passengers in each of the end driving cabs. The loaded weight is 12 tons 14 cwt. The principal dimensions of the car are shown on the drawing.

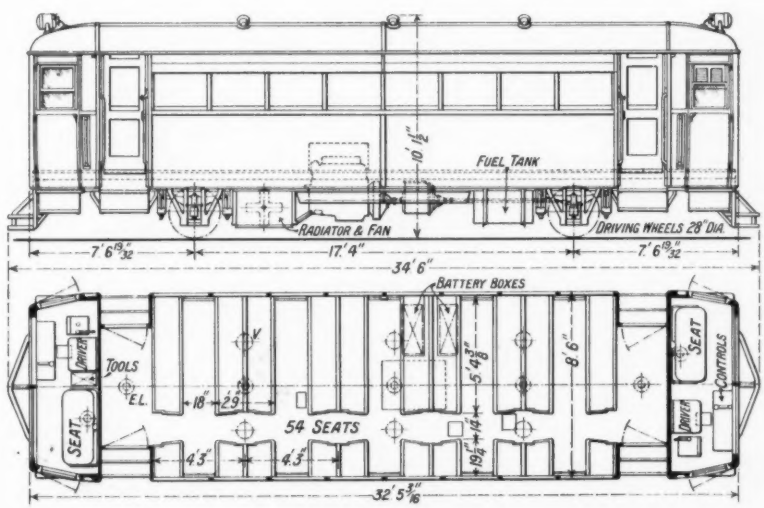
A 4-cylinder 4 R.U.L. Dorman petrol engine developing 75 b.h.p. at 2,400 r.p.m. is so arranged under the car that the portion projecting into the native saloon comes under the seats. It has a single-plate dry clutch, from which the drive is taken through a three-speed gearbox in which is incorporated a forward and reverse gear, giving identical speeds in either direction. The operation is by dog-clutch for forward and reverse, first and top gear, and by sliding spur wheel for second gear, baulking rings being provided for the top gear clutch. With this type of gearbox a simple straight through change is obtained and no gate mechanism is required. The final drive is by cardan shaft and universal coupling to an enveloping worm reduction gear on the driving axle. An electric starter is provided in addition to a handle. The petrol tank is beneath the car. The car has a maximum speed loaded on the level of 40 m.p.h. and can accelerate to maximum speed in 72 seconds. It will accelerate to 40 m.p.h. on a 1 in 50 gradient in 110 seconds.

Cooling, equally effective whichever way the car is running, is by means of a twin spiral tube radiator underneath the floor. There is a fan for each section on a common shaft driven from the engine by a V belt.

The wheel centres are of cast steel, pressed in the usual way on to the axles, and have light section tyres. The axleboxes are of cast steel with gun-metal bearings lined with whitemetal. The laminated springs over each axle-box have rubber auxiliary springs. Expanding-drum hydraulic brakes are provided and operated by a pedal in each cab.

The shell of the vehicle is of all-metal construction of special design to obtain maximum strength with a low tare weight, and to this end the body is constructed integrally with the underframe. The interior finish of the saloon is in birch-faced plywood and pitch pine low relief bandings. The ceilings throughout are of plywood painted white with low relief bandings. Continuous parcel racks of pitch pine laths for light luggage are fitted along the body sides. The seats in the native saloon are of birch plywood reinforced by light timber framing and carried on mild steel supports. The seats for the upper class are sprung and covered with Rexine.

There are no glass windows in the native saloon, but metal faced plywood shutters, arranged to drop into the body side, are fitted at all saloon window openings. Metal louvre hoods are fitted at each opening. A hinged windscreen is provided at each driving position, and fitted with a suction windscreen wiper. Half drop lights and



Elevation and plan of petrol railcar for Junagad, showing two upper class seats in each driver's compartment and 50 lower class in central saloon

Combined driver's and upper-class passengers' compartment

Interior of third-class accommodation in main saloon, Junagad petrol railcar

drop louvres are provided in front of the upper class seats and doors of the two end compartments. Acme ventilators are fitted in the roof. Electric lighting is provided from a 12-volt battery. At each end are a head and a tail light, the former being powerful enough to pick out a white object at 600 ft.

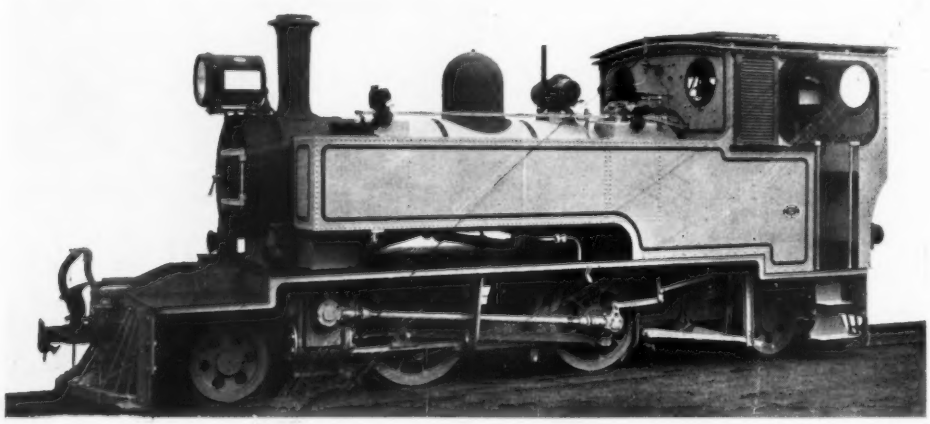
The electric equipment consists of an M.C.L. type 12-volt, high-speed dynamo for charging the accumulators, directly driven from the engine with an automatic cut-out and controller. A solenoid starter switch completes the starter circuit and is in turn operated by a small push button on each dash panel.

Duplicate controls are provided in each cab, there being but one gear change control handle for both cabs, in each of which is an electric speedometer. All the pedals and controls in one driving cab are covered over and locked when the driver is operating from the other end.

A special feature of this car is the incorporation of a deadman's handle which operates as follows: The engine throttle control handle, which is spring loaded and in which is incorporated a push button, must be continuously held while the car is running. Immediately the throttle control handle is released the push button flies up and earths the magneto circuit, stopping the engine and, at the same time, completes an electric circuit from the battery to an electro-pneumatic valve incorporated in the braking system, which opens up communication between a vacuum chamber and a small vacuum cylinder. The latter operates the hydraulic brake system. The necessary vacuum is obtained by suction from the engine induction pipe.

Component parts of the vehicle have been supplied by the following firms:—

Bostock & Bramley Limited: Gearbox and worm reduction gear.
W. H. Dorman & Co. Ltd.: Petrol engine.
Hardy Spicer & Co. Ltd.: Cardan shaft and universal coupling.
I.C.I. (Rexine) Limited: Rexine.
Pritchett & Gold & E.P.S. Company: Nife battery.
M.C.L. & Repetition Co. Ltd.: Electrical equipment.
Spiral Tube & Components Company: Radiators.
Automotive Products Limited: Lockheed hydraulic brakes.



New 2-4-2-type tank locomotive for the Mysore Railways
(*For description see page* 192)

RAILWAY NEWS SECTION

PERSONAL

NEW G.W.R. CHAIRMAN

The Rt. Hon. Sir Robert S. Horne, G.B.E., K.C., M.P., has been elected Chairman of the Great Western Railway in place of the late Viscount Churchill, G.C.V.O. Sir Robert is a distinguished figure in public life and has been a Director of the Great Western Railway Company since 1923.

THE LATE VISCOUNT CHURCHILL
THE HON. ALEXANDER SHAW'S TRIBUTE

Speaking at Colombo recently on board the P. & O. *Maloja*, en route for Australia and New Zealand, the Hon. Alexander Shaw (Chairman and Managing Director of the P. & O. Steam Navigation Company) said:—

"Times of great trial and difficulty have at least this compensation that they reveal a man's true friends. All of us, except the very young, have known times of test when, so to speak, the infra-red rays of adversity, although they showed up the hollowness of some, yet revealed in others hidden riches of courage and reserves of friendship. In the latter class my friend and colleague, Viscount Churchill, of whose death I was shocked to learn three days ago, was a shining example. As a Director of the P. & O. Company, as Chairman of a great railway, and as the head of a great banking institution, he filled a high place in the business world and in the public life of Britain. He was the friend of kings; and the sincere charm of his manner and the kindliness that underlay it made him no less the friend of the humblest who worked with or under him. I feel his taking away more than I dare express. Among the Border Hills by the Tweed he was my neighbour. His grounds commanded a view of the Eildons at a point where the great Sir Walter Scott was wont to linger in his walks round his own beloved countryside. How much Victor Churchill will be missed there only those who knew him can imagine; and there spring to the mind as not inappropriate the words of the great Sir Walter himself:—

"'Now is the stately column broke,
The beacon's light is quenched in smoke;
The trumpet's silver sound is still,
The warden silent on the hill.'

"There we must leave him; but as we go forward to the tasks of the days and the years ahead we may well be encouraged by the memory of a life so rich in devotion to the service of his King and his Country."

The Rt. Hon. Sir Robert S. Horne, P.C., G.B.E., K.C., M.P., who has been appointed Chairman of the Great Western Railway Company, was born in Scotland in 1871 and was educated at George Watson's College, Edinburgh, and at the Glasgow University. He was admitted an Advocate of the Bar of Scotland in 1896, at which he practised for many years. In 1910, on the recommendation of the Lord Justice

Elliott [*& Fry*

The Right Hon. Sir Robert S. Horne, P.C., G.B.E., K.C., M.P.,

Elected Chairman of the Great Western Railway Company

General of Scotland, he was made one of His Majesty's Counsel in Scotland. During the war he was successively Assistant Inspector General of Transportation, Director of Admiralty Labour Materials and Priority, Director of Admiralty Labour Department, and Third Civil Lord of the Admiralty. From his early days, Sir Robert has been keenly interested in social and political questions and since 1918 he has represented the Hillhead Division of Glasgow in the House of Commons. In the Coalition Government of 1918-22 he held successively the positions of Minister of Labour, President of the Board of Trade and Chancellor of the Exchequer. In 1919 he was sworn of the Privy Council, was created K.B.E. in 1918 and G.B.E. in 1920. In 1923 he was appointed a Director of the Great Western Railway Company to fill the vacancy on the Board caused by the death of Mr. J. G. Griffiths and in the same year he was appointed a Director of the Underground Electric Railways Company of London. His most important Directorships, apart from the Great Western, are Imperial Smelting Corporation Limited (of which he is Chairman), Lloyds Bank Limited, Commercial Union Assurance Co. Ltd., P. & O. Steam Navigation Company and the Suez Canal Company.

A memorial service for Lord Aberconway was held on January 26 at St. Margaret's, Westminster. Among those present were:—

The Earl of Cromer, Sir Edmund Wyldbore-Smith, Hon. Evelyn Hubbard, Mr. Albert I. Belisha and Mr. F. D. Docker, Directors of the late Metropolitan Railway; Mr. W. J. H. Hunter (representing Sir Clarendon G. Hyde, Deputy Chairman, Met. Ry.); Lord Ashfield, Chairman, London Passenger Transport Board; Mr. J. S. Anderson, formerly General Manager of the Metropolitan and now Secretary and Treasurer, L.P.T.B.; Mr. H. S. Chapman, Secretary, Met. Ry. Co.; Mr. A. V. Larcombe (representing Mr. G. Hally, formerly Traffic Manager and Chief Mechanical Engineer, Metropolitan, and now operating Manager, Railways, L.P.T.B.; Mr. Murray Griffith, Director of the late Metropolitan District Railway; Col. Sir George McLaren Brown, European General Manager, C.P.R.; Mr. Francis Glyn (representing Glyn Mills & Co.); Mr. F. G. E. May (representing Lord Davies, Director, G.W.R.); Messrs. H. A. Wright and J. H. Foster, Hammersmith & City Railway Joint Committee; Mr. H. Haigh, Secretary, Railway Convalescent Homes.

It is with regret that we learn of the death on January 27 of Dr. Manuel Augusto Montes de Oca, G.B.E., Chairman of the Local Board and Legal Representative of the Buenos Ayres & Pacific, and a Local Director of the Argentine Great Western Railway. He was President of the Reception Committee for the visit of the Prince of Wales in 1925 and received the honour of G.B.E. in 1926.

We regret to record the death on January 24 of Mr. J. A. Hookham, M.Inst.C.E., M.I.Mech.E., late Locomotive, Carriage and Wagon Superintendent, North Staffordshire Railway, and subsequently Mechanical Engineer, Stoke-on-Trent, L.M.S.R. Mr. Hookham gained his early experience at Longhedge, London Chatham & Dover

Railway, and subsequently at Ashford, S.E. & C. Railway. In 1902 he was appointed Locomotive Works Manager and Chief Assistant, North Staffordshire Railway, subsequently being promoted to be Locomotive, Carriage and Wagon Superintendent. At the time of the absorption of the N.S.R. in the L.M.S. system, he remained at Stoke as Mechanical Engineer, L.M.S.R., retiring from that position in 1925. He was a member of the Institutions of Civil and Mechanical Engineers.

Mr. D. Rodie has resigned from the position of Commercial Manager, New Zealand Government Railways, after forty years' service with the Railway Department. He is succeeded by Mr. A. W. Wellsted, Chief Clerk in the Branch.

Mr. Rodie joined the Railway Service as a cadet in the Traffic Branch and was trained in every phase of the work of that branch. He was District Traffic Manager in Invercargill in 1924 when he was selected to take charge of the Commercial Branch in Wellington as Commercial Manager at the time of the reorganisation of the Traffic Department and the formation of a separate Commercial Branch. At a recent meeting of the Government Railways Board, the Chairman and Members of the Board made highly eulogistic reference to Mr. Rodie's career in the Department, and voiced their keen regret at losing his services.

Mr. A. W. Wellsted, who, as announced above, has been appointed Commercial Manager, New Zealand Government Railways, joined the railway service in 1900 as cadet in the Traffic Branch at Dunedin and subsequently has had a thorough training in, and gained comprehensive experience of the working of that branch. He was appointed Business Agent in the Commercial Branch in 1925, and occupied that position in the Auckland District until 1932, when he was appointed Chief Clerk to the Commercial Manager at Wellington, the post he now vacates, to become Manager.

PERMANENT WAY INSTITUTION

As foreshadowed in our issue of December 8 last, Mr. A. R. Cooper has been re-elected President of the Permanent Way Institution for 1934, the Institution's jubilee year. The following were new appointments among the officials:—Mr. F. Lawson, of Stratford, L.N.E.R., Hon. Treasurer (in succession to Mr. H. G. Holloway, whose death we recorded in our issue of December 15); Mr. H. Janes, of the Southern Railway, Hon. Assistant Secretary, which is a new office.

Mr. H. A. Vernet, late Chairman of the Central Argentine Railway, left estate valued at £169,909.

We regret to record the death on January 30 of Mr. John Strachan, C.M.G., Director of Transport, Trinidad, and until last autumn General Manager and Chief Engineer, Federated Malay States Railways.

Mr. Follett Holt, M.Inst.C.E., who received the New Year honour of K.B.E., has felt himself obliged to resign from the Board of Directors of the Great Western of Brazil Railway—of which he was Chairman—due to pressure of other work. Mr. G. H. Harrisson, C.M.G., D.S.O., who is at present on a visit to the railway, has been elected Chairman.

Mr. G. V. O. Bulkeley, C.B.E., General Manager of the Nigerian Railway, is on a short visit to this country recovering from recent indisposition, and informs us that he expects to return to Nigeria about April.

Mr. H. Haigh, F.C.I.S., who, as announced in THE RAILWAY GAZETTE of January 26, has been appointed Secretary of the Railway Convalescent Homes, commenced his business career in the offices of Hetherington & Anderson, merchants, of Bradford, Manchester, Glasgow, &c., where he eventually rose to the position of Cashier and Office Manager. He left after eleven years' service in order to join the Army, in which he served with the Yorkshire Regiment, and from which he was invalided out in 1916. He was subsequently appointed Accountant to Charles Johnson & Co. Ltd., home and foreign shipping merchants, and ten years later became Secretary and Manager to Henry Burgess & Co. Ltd., manufacturers. Having in the meantime become well known as a lecturer on commercial subjects at Bradford Technical College, he was persuaded, three years later, to take charge of the Department of Commerce and Foreign Languages at the Leicester College of Technology. Preferring a business career, however, Mr. Haigh resigned this post the following year, and was appointed Assistant Secretary to the Railway Convalescent Homes, which office he had held for over two years when he was appointed Secretary in succession to Mr. W. R. R. Culver, who retired at the close of last year. In December, 1925, he passed the final examination of the Chartered Institute of Secretaries, being awarded first place in the examination list, the coveted "Sir Ernest Clark" prize, and, in addition, a special certificate for exceptional merit; he was elected a Fellow of the Institute in 1928.

Mr. H. McIntosh, M.I.MechE., has been appointed Assistant Mechanical Engineer and Running Superintendent, Great Northern Railway, Ireland, as from February 1.

Mr. D. Rodie,

Commercial Manager, New Zealand Government Railways, 1924–34

Mr. A. W. Wellsted,

Appointed Commercial Manager, New Zealand Government Railways

Mr. H. Haigh, F.C.I.S.,

Appointed Secretary, Railway Convalescent Homes

Permanent Way Institution Annual Dinner

Coming Jubilee Celebrations

Mr. Arthur R. Cooper, Chief Engineer of the London Passenger Transport Board, took the chair at the annual winter dinner of the Permanent Way Institution, of which he had just been re-elected President, on Saturday last. Those present included:—

Lt.-Col. E. P. Anderson, Messrs. H. Bates, D. R. Bennett, F. W. Calow, R. Carpmael, N. Clougher, J. Condy, H. A. Conisbee, N. Cooper, E. R. Dashper, N. C. Davis, A. W. M. Dyke, W. S. Every, H. Garth, R. F. B. Gaudin, R. Griffiths, R. Gund, H. Janes, J. A. Kay, G. F. Kent, J. H. Knotts, C. A. G. Linton, S. E. M. McLewin, J. Melville, J. Miller, R. F. Morkill, Sir Charles Morgan, Lt.-Col. A. H. L. Mount, Messrs. J. W. Punter, A. S. Quartermaine, V. A. M. Robertson, H. F. Russ, Scott, C. E. R. Sherrington, A. W. Szlumper, Gilbert S. Szlumper, J. E. Taylor, B. Tazewell, E. Treacher, R. D. Walker, W. K. Wallace, D. D. Williams, W. A. Willox, L. Wynn-Williams.

Mr. Gilbert S. Szlumper, Assistant General Manager of the Southern Railway, proposing the toast of "The Institution," referred to his previous engineering appointments, and his association with the institution. He said there could be no doubt as to the necessity for such an institution, which was an aid to efficiency in that it enabled those who actually had to face day-to-day problems to meet and exchange information. The expenditure of civil engineering departments of the group railways amounted to £19 million a year, of which £11½ million, or nearly one-fourteenth of the railways' total expenditure, was in respect of the renewal and maintenance of the permanent way. In carrying out this work 1¾ million cu. yd. of ballast, 189,000 tons of rail and 3¾ million sleepers were used. These figures pointed to the necessity for continually improving anything which might tend to a higher standard of efficiency in maintenance. The welding of crossings, and sorbitic and other treatments for prolonging the life of rails, were examples in which advance had been made, and in this advance the Permanent Way Institution had played an important part. Referring to the Institution's jubilee this year, he said that the goodwill of the railway companies would probably enable the jubilee to be celebrated more fittingly than if the institution was dependent upon its own resources. On the subject of speed, Mr. Szlumper said that people to-day were prepared to pay a great deal for this commodity, and he thought consideration would have to be given to improving the track still more to enable higher speeds than those at present prevailing to be obtained. He looked forward to the day when a speed of 100 m.p.h. would not be uncommon. As regards safety, the record of the railways of Great Britain was one of which to be proud. None were more sincere in wishing the institution continued prosperity than those who were connected with the general policy of the railways, and who realised that the permanent way department formed the basis of all good service upon the railways.

Mr. W. K. Wallace, Chief Engineer of the L.M.S.R., proposing the toast of "The President," referred to Mr. Cooper's excellent work on behalf of the institution, particularly by his visits to the various sections. The members were to be congratulated on their good fortune in having Mr. Cooper as their president for the jubilee year. The office of president of an institution such as theirs was not a light one, and, as it was always held by busy people, he felt sure they must experience difficulty in fitting in the work with their ordinary official duties. Mr. Cooper was one of those men who had achieved success without the necessity of having been born in Scotland!

Mr. A. R. Cooper, Chief Engineer, London Passenger Transport Board, responding, expressed pleasure at Mr. Szlumper's presence, following on that of other distinguished guests representing railway management in previous years. Referring to his recent visits to some of the sections, Mr. Cooper said that their activities indicated that the institution was a very live one, and he complimented the sectional officers on the good work they were doing. On the question of speed, he agreed there was need for consideration of what the permanent way staff could do to facilitate higher speeds being attained. Referring to the institution's jubilee, Mr. Cooper was pleased to say that the railway companies were going to give tangible assistance so that the event might be suitably commemorated, and this went to show that the railway managements were interested in the work of the institution.

Sir Charles Morgan, a Director of the Southern Railway Company, proposing the toast of "The Guests," made special reference to the presence of Railway Inspecting Officers of the Ministry of Transport, whose object, on their official visits, was to inspect new works in the interests of safety, or to ascertain the cause of accidents with a view to preventing such accidents in the future, and he had never known a case where there had been reason to question the decisions they had come to. He also mentioned Mr. J. A. Kay, Editor of THE RAILWAY GAZETTE, a paper of which he had long held a high opinion. It contained much useful information for the young and ambitious in the railway world, as well as for responsible men such as he saw round him. Referring to Mr. C. E. R. Sherrington, Secretary of the Railway Research Service, Sir Charles said that the information which he collected for the management and officers of the group railways would do much to bring back some degree of prosperity to the railway world.

Lieut.-Colonel E. P. Anderson, Inspecting Officer, Ministry of Transport, responding, said that statistics showed that there were no railways in the world with better or safer tracks than the British railways. In the course of their work of conducting enquiries, he and his colleagues, the other Inspecting Officers of the Ministry of Transport, frequently came across notable contributions made by members of the institution towards increased efficiency on the railways.

Mr. John Miller, Engineer, North Eastern Area, L.N.E.R. proposed the toast of "The Executive and Sectional Officers," and paid tribute to the excellent work they performed for the institution. Mr. S. E. McLewin, the Honorary Secretary, responding, said that he was particularly pleased at Mr. Miller's reference to the Sectional Secretaries, whose vital function to provide the link between the scattered groups of members and the executive was so efficiently performed. The toast of "Absent Friends" was proposed by Mr. R. D. Walker, recently appointed Chief Engineer and General Manager of the Kowloon-Canton Railway, who spoke of the keen interest shown by members abroad in the affairs of the institution.

At the annual winter general meeting, which preceded the dinner, Mr. Cooper was re-elected President for the year. Mr. F. Lawson was elected Honorary Treasurer and Mr. H. James Honorary Assistant Secretary. A substantial balance was reported, and a gratifying increase in the number of new members. Preliminary arrangements were approved for the Jubilee Convention to be held in London from July 4 to 14 next.

Forthcoming Events

Feb. 5 (*Mon.*).—Society of Engineers, at Geological Society, Burlington House-Piccadilly, London, W.1, 6 p.m. Presidential Address by Mr. A. M. A. Struben, O.B.E.

Stephenson Locomotive Society, at King's Cross Station, London, 6.30 p.m. "The Evolution of the Single-Wheeler Locomotive," by Mr. A. G. Williamson.

Feb. 6 (*Tues.*).—L.N.E.R. (York) Lecture and Debating Society, at Railway Inst., Queen Street, 7 p.m. "How Parliament has dealt with the Salter Report," by Mr. P. A. Harverson.

Retired Railway Officers' Society, in Room 300, Great Eastern Hotel, Liverpool Street, London, E.C.2, 2.30 p.m. Ordinary Meeting.

Feb. 7 (*Wed.*).—British Wood Preserving Association, at Auctioneers' and Estate Agents' Inst., 29, Lincoln's Inn Fields, London, W.C.2, 6 p.m. "The Use of Treated Timber in Railway Stock," by Mr. W. H. Brown.

Permanent Way Institution (Newcastle), at Mining Inst., Westgate Road, 7 p.m. "Maintenance of Way by a Combined Gang Equipped with Rail Motor Car," by Mr. W. R. Thrower.

Feb. 8 (*Thurs.*).—G.W.R. (London) Lecture and Debating Society, at Paddington Station, 5.45 p.m. "The Present Position in Foreign Countries as between Railways and States," by Mr. C. E. R. Sherrington.

Institution of Electrical Engineers, at Grosvenor House, Park Lane, London, W.1, 7 for 7.30 p.m. Annual Dinner.

Société des Ingénieurs Civils de France, at Inst. of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. "Future Prospects of Reinforced Concrete and Steel for Bridges of very large Spans," by M. Henry Lossier.

New 2-4-2 Tank Locomotives, Mysore Railways

(*See illustration on page* 188)

Three 2-4-2 tank locomotives have recently been built by W. G. Bagnall Limited for service on the 2 ft. 6 in. gauge section of the Mysore Railways. The service for which they are intended involves the working of light trains at relatively high average speeds. The locomotives are fitted with R.C. poppet valve gear, Sunbeam electric light, Ross pop safety valves and top feed clack-boxes. The R.C. poppet valve is of the outside drive type and consists of one camshaft only for each engine. This is fitted with the necessary forward and back gear cams, and is driven from one end by means of bevel gear, from which a shaft connection is made with a return crank gearbox, also fitted with bevel gears, one of which is keyed to the return crank pin. The main drive shaft is tubular and fitted with universal couplings at each end, the driving torque being counteracted by an anchor link in the manner usual with the R.C. return crank gearbox drive. The single camshaft extends across the engine and operates the valves for both cylinders. The cylinders are of the usual design associated with this type of poppet valve gear, and the valves themselves operate in the horizontal plane.

Grease lubrication is utilised throughout, the coupled wheel axleboxes having Ajax hard grease lubrication, whilst the coupling and connecting rods, brake work, &c., are fitted with Tecalemit grease nipples for soft grease lubrication. The following are the main particulars:—

Cylinders, diameter	8 in.
stroke	12 in.
Wheels, coupled, diameter ...	3 ft. 0 in.
bogie, diameter ...	2 ft. 0 in.
Wheelbase, rigid	5 ft. 6 in.
total	16 ft. 11 in.
Boiler working pressure ...	160 lb. per sq. in.
Heating surface, tubes ...	264·5 sq. ft.
firebox ...	30·0 sq. ft.
Total ...	294·5 sq. ft.
Grate area	6·75 sq. ft.
Tractive effort at 85 per cent. boiler pressure	2,900 lb.
Tank capacity	400 gallons.
Bunker capacity	35 cub. ft.
Weight in working order ...	18½ tons.

These locomotives were built under the inspection of Messrs. Rendel, Palmer & Tritton.

Railway Departmental Organisation

The winning effort in the G.W.R. Lecture and Debating Society's 1933/34 Prize Essay Competition discussed the question: "Should the company's departmental system be modified? If so, how and why?" The successful competitor, Mr. E. E. Potter, of the District Goods Manager's office, Gloucester, read his essay at Paddington on January 25, under the chairmanship of Mr. Raymond Carpmael, Chief Engineer, who also distributed the prize awards. Mr. Carpmael was undertaking these duties for Lord Palmer, Deputy Chairman of the Great Western Railway, who was unable to be present.

Mr. Potter began with the recognition that organisation was only the means to an end, the end being the carrying on of the entire business of the company at the highest possible standard of efficiency. He referred to the Great Western Railway as the sole preserver of the so-called English, or departmental system of organisation, and, while admitting its effectiveness, expressed the view that modifications were desirable. The technical or "spending" departments were excluded from the need for change as being essentially the business of the specialised engineers (civil, mechanical and signal) in charge of them. Locomotive running was a border-line activity, with both technical and operating sides, but he thought the present Great Western arrangement of control by a Locomotive Running Superintendent, primarily responsible to the Chief Mechanical Engineer, but also associated with the traffic officers, could not be improved upon. He suggested that two other "spending" departments (the stores and stationery departments) might advantageously be amalgamated.

Modifications outlined in the essay mainly concerned the revenue earning departments, *i.e.*, traffic, goods, docks, road transport and hotels, which could be appropriately brought together into a public service department. This department would present to the public the various services the company had to offer in a more comprehensive way than could be realised with each department separately organised. Sectionalisation would still be necessary, but there would be unity of control, exercised by a committee comprising the heads of each section. The main achievement of this re-organisation would be the concentration into one section of all the purely commercial business, and into other sections of operating, publicity, and staff matters, without the present passenger and goods, &c., differentiation. In the new organisation there would also be a general section. The docks, road transport, and hotels sections would function largely as at present, except for the transference of appropriate matters to the staff and general sections of the proposed new department.

Holding the view that commercial and operating is a more effective and scientific division of function than goods and passenger, the aim of the essayist appeared to be to adapt the present Great Western Railway organisation, without drastic re-modelling, to a changed conception of function. Territorially, the suggested organisation would be implemented by merging the present traffic divisions and goods districts into co-extensive unified areas, each controlled by one official, with appropriate assistants. This thoughtful paper produced a good general discussion. Many of the ideas it contained were approved and even expanded by subsequent speakers, but considerable doubt was expressed concerning the efficacy of administration by committee.

RAILWAY AND OTHER MEETINGS

Westinghouse Brake & Saxby Signal Co. Ltd.

The Right Hon. Lord Southborough, G.C.B., presiding at the 53rd ordinary annual meeting of this company on January 26, said that the loss on the year's trading, both at home and abroad, had been largely due to the reduction in the volume of orders. Competition had been extremely keen; at the same time they believed that they had obtained their usual proportion of the work available. Customers both at home and abroad had not been in a financial position to spend the money necessary to give the normal amount of business, and as regarded overseas trade, exchange restrictions and the prohibition of the export of money had caused grave difficulty. Their subsidiary companies had made losses, but had obtained a satisfactory proportion of the greatly reduced volume of orders placed. As a result of the transfer of the works from York Road to Chippenham and a constant watch for the most efficient means of production, they had secured substantial reductions in the costs of production at the Chippenham Works without sacrificing in any way the quality or efficiency of the apparatus manufactured by the company.

There was a tendency towards improvement in general business, it was marked in this country, and he hoped that it would reach their subsidiary companies overseas. They rejoiced to note an improvement in the position of British railways, and they had reason to know that the railway companies were actively preparing plans which would involve the purchase of this company's types of manufacture. He felt confident, however, that, barring unforeseen accidents, political and economic, they would meet again with a record showing a marked improvement.

The report and accounts were unanimously agreed to.

NOTES AND NEWS

L.N.E.R. Week-End Cruises.—This year there will be eleven week-end cruises to Holland and Belgium by the ss. *Vienna*.

New L.M.S. Station for Southend Line.—Construction of a new passenger station, to be known as Elm Park, between Dagenham and Hornchurch on the London, Tilbury and Southend line, has been authorised by the L.M.S.R. The station will serve a new estate to consist of 5,000 houses and shops.

Irish Road Services.—The *Financial Times* states that the Irish Free State offices of Carter Paterson & Co. and Pickfords, the capitals of which were recently acquired by the four British main-line railway companies, are to be taken over and worked by the Great Southern Railways Company of Ireland.

Reduction in Harwich-Antwerp Cabin Charges, L.N.E.R.—The charges for private cabins by the Harwich-Antwerp night route to and from the Continent have been reduced by about a third. The cabin charges on the Harwich-Hook of Holland service were reduced last year.

Railway Conciliation Machinery.—Negotiations were resumed on January 29 between representatives of the four railway companies and the three railway trade unions in regard to the companies' proposals for the reorganisation of the existing negotiating machinery for settling disputes on wages and conditions. A further conference will be held in ten days or a fortnight.

Breaches on the South African Railways.—The prolonged drought in South Africa has now been succeeded by heavy rainfalls, sufficient in many places to cause widespread floods. It is reported from South-West Africa that a passenger train has been marooned at Keetmanshoop for about a fortnight, due to breaches of the formation in front and behind it extending over long distances. As quickly as repairs have been made, further floods have come down and caused fresh breaches, especially to the north of Keetmanshoop. Some of the passengers have, apparently, been evacuated by aeroplane, but many are still in the train.

New London Warehouse, L.M.S.R.—The largest railway-owned warehouse in the city has just been completed—the L.M.S. depot at Haydon Square, E. It has been constructed for the purposes of a railhead distribution centre, of which it forms the largest example in the country. It consists of two basements, ground and seven upper floors, and the total contents of the building amount to 1,100,000 cu. ft., of which 665,500 is used for warehouse accommodation and 434,500 for offices, &c. The total floor space is approximately 11,000 sq. yards. Loading accommodation for both railway and road vehicles is provided on the ground floor, with lifts for both passengers and goods. The whole of the premises will be occupied by Wiggins Teape & Alex. Pirie (Sales) Limited.

Locomotive Driver Killed on L.M.S.R.—Last Monday the driver of the 6.30 a.m. Tring to Euston train was killed as a result of the bursting of a boiler tube. The fireman, although seriously injured, brought the train to a standstill.

Road Accidents : Early Legislation Promised.—In the House of Commons on Monday, Mr. Oliver Stanley, Minister of Transport, replying to Mr. Anstruther-Gray and to Mr. Graham White, said the Government was deeply concerned at the grave position shown by the recently published returns of road accidents during 1933, and had decided to introduce legislation to deal with the subject at an early date.

Canadian Pacific Earnings.—The monthly statement for December, 1933, shows gross earnings of $9,913,000, an increase of $212,000 on December, 1932, whereas in the working expenses of $6,667,000 there was a reduction of $724,000, so that net earnings improved by $936,000. For the whole year gross earnings amounted to $114,270,000, a decrease of $9,667,000, but the net earnings of $20,862,000 showed an increase of $772,000.

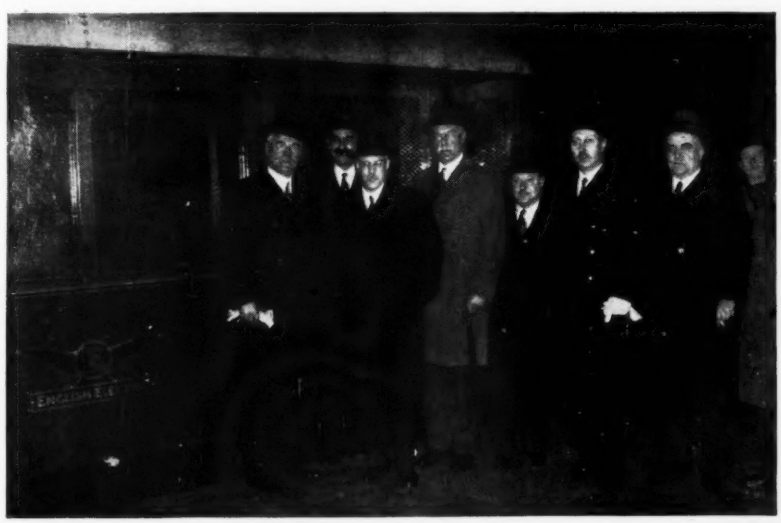
Westinghouse Brake Company's Polish Contract.—As announced in our Contracts and Tenders section this week, a Reuters message states that representatives of the Polish Ministries of Finance and Communications have signed at Warsaw a preliminary agreement with the Westinghouse Brake & Saxby Signal Company. The value of the contract is stated to be £4,642,857 at present rates. The work will be completed in six years and about 60 per cent. of the total order will be carried out in Poland.

The Railway Club.—At a meeting of the Railway Club held at 57, Fetter Lane, E.C.4, on January 12, Mr. J. D. Goffey read a paper on "Why the L. & N.W. Railway was the Premier Line."

Transport Unification in New York.—It is reported that the New York City authorities have begun direct negotiations with the individual urban transit companies with a view to arriving at an agreement on unification.

Lectures on the Road and Rail Traffic Act.—Mr. Frederick G. Bristow, C.B.E., Secretary of the British Road Federation, and General Secretary of the Commercial Motor Users' Association, is to deliver two public lectures, entitled "The Road and Rail Traffic Act, 1933," on February 5 and 12, at the North-Western Polytechnic, Prince of Wales Road, N.W.5. Admission is free without tickets, and the lectures are due to commence at 7.30 p.m.

Gas Welding.—The International Technical Advisory Committee for Carbide and Acetylene Welding, with headquarters at Geneva, is an expert collective body dealing with subjects relating to carbide and oxy-acetylene welding and cutting, and comprises delegates from Great Britain, Holland, Sweden, Poland, Germany, Belgium, Switzerland, Austria, Italy and Jugoslavia. The Committee meets periodically in different Continental cities to discuss subjects which have been dealt with by correspondence, and in due course



Some of the eminent railway personalities present at a trial run on Friday last of the English Electric Company's diesel-electric railcar described and illustrated in our "Diesel Railway Traction Supplement" of December 29 last

disseminates through various channels the conclusions reached. At a meeting held in Venice last September, one of the subjects discussed was the progress made in several Continental countries with welding together of rails and rebuilding of worn rails. Other subjects on the agenda were: The choice of suitable filler rods, welding of steel structures, welding in repair work and in handicraft.

Opening of New L.M.S. Offices.—The new offices of the London Midland & Scottish Railway Company in Seymour Street, which are to be known as Euston House and have been built to accommodate various departments which have been located in different buildings around Euston station, are to be formally opened by the Minister of Transport, the Hon. Oliver Stanley, M.P., on Monday afternoon, February 12.

Agreed Charges.—As will be seen from the legal notice published on pages 196–7, several applications, in addition to those mentioned on pages 32 and 33 of our issue of January 5 last, have been lodged with the Railway Rates Tribunal for its approval of agreed charges under the provisions of Section 37 of the Road and Rail Traffic Act, 1933. Particulars of these additional agreed charges and applications may be inspected at the office of the Tribunal, 2, Clement's Inn, London, W.C.2. Notices of objection must be filed at the office of the Registrar, at the above address, on or before February 20.

Western Australia Government Facilitates Transport.—Speaking at a dinner held in London last week, to celebrate the payment of the first dividend by the Wiluna Gold Corporation Limited, Mr. F. H. Hamilton referred to the fact that the Western Australia Government had done its very best in the matter by guaranteeing a note issue for £300,000, all of which had been repaid. Moreover, the Government had gone to the expense of building a railway of a length of 100 miles to the mine and had also deepened the Geraldton Harbour in order to facilitate transport.

Extended Royal Scot Tour.—The Royal Scot train, which since January 1 has been on tour of England and Scotland, following its visit to North America, has proved such an attraction in this country that the L.M.S.R. has decided to extend the home tour to embrace eight more towns. Originally planned to finish at Leicester on January 28, the tour will now continue in February at the following places: Southend (February 3-4), Llandudno (6), Holyhead (7), Southport (Chapel Street station, 8-9), Blackpool (North station, 10-11), Barrow (Central station, 12), Morecambe (Promenade station, 13-14) and Blackburn (16). Over 500,000 people have now inspected the Royal Scot since it was exhibited at Euston on its return from Canada.

British and Irish Railway Traffic Returns

GREAT BRITAIN	Totals for 4th Week			Totals to Date		
	1934	1933	Inc. or Dec.	1934	1933	Inc. or Dec.
	£	£	£	£	£	£
L.M.S.R. (6,941¾ mls.)						
Passenger-train traffic ...	353,000	334,000	+ 19,000	1,410,000	1,378,000	+ 32,000
Merchandise, &c. ...	429,000	362,000	+ 67,000	1,684,000	1,453,000	+ 231,000
Coal and coke ...	285,000	306,000	− 21,000	1,084,000	1,046,000	+ 38,000
Goods-train traffic ...	714,000	668,000	+ 46,000	2,768,000	2,499,000	+ 269,000
Total receipts	1,067,000	1,002,000	+ 65,000	4,178,000	3,877,000	+ 301,000
L.N.E.R. (6,339 mls.)						
Passenger-train traffic ...	227,000	223,000	+ 4,000	927,000	922,000	+ 5,000
Merchandise, &c. ...	328,000	255,000	+ 73,000	1,228,000	1,016,000	+ 212,000
Coal and coke ...	263,000	256,000	+ 7,000	990,000	917,000	+ 73,000
Goods-train traffic ...	591,000	511,000	+ 80,000	2,218,000	1,933,000	+ 285,000
Total receipts	818,000	734,000	+ 84,000	3,145,000	2,855,000	+ 290,000
G.W.R. (3,753 mls.)						
Passenger-train traffic ...	146,000	139,000	+ 7,000	615,000	616,000	− 1,000
Merchandise, &c. ...	169,000	145,000	+ 24,000	672,000	584,000	+ 88,000
Coal and coke ...	112,000	115,000	− 3,000	447,000	444,000	+ 3,000
Goods-train traffic ...	281,000	260,000	+ 21,000	1,119,000	1,028,000	+ 91,000
Total receipts	427,000	399,000	+ 28,000	1,734,000	1,644,000	+ 90,000
S.R. (2,181 mls.)						
Passenger-train traffic ...	226,000	210,000	+ 16,000	924,000	902,000	+ 22,000
Merchandise, &c. ...	59,000	53,000	+ 6,000	221,000	205,500	+ 15,500
Coal and coke ...	38,000	39,000	− 1,000	142,000	137,500	+ 4,500
Goods-train traffic ...	97,000	92,000	+ 5,000	363,000	343,000	+ 20,000
Total receipts	323,000	302,000	+ 21,000	1,287,000	1,245,000	+ 42,000
Liverpool Overhead ... (6½ mls.)	1,097	1,013	+ 84	4,498	4,218	+ 280
Mersey (4½ mls.) ...	4,124	3,850	+ 274	17,462	16,444	+ 1,018
*London Passenger Transport Board ...	484,700	—	—	14,884,200	—	—
IRELAND						
Belfast & Co. Dn. pass. (80 mls.)	1,843	1,779	+ 64	7,547	7,598	− 51
,, ,, goods	515	528	− 13	1,927	1,815	+ 112
,, ,, total	2,358	2,307	+ 51	9,474	9,413	+ 61
Great Northern pass. (562 mls.)	6,250	6,600	− 350	28,450	31,350	− 2,900
,, ,, goods	8,350	9,400	− 1,050	28,400	33,550	− 5,150
,, ,, total	14,600	16,000	− 1,400	56,850	64,900	− 8,050
Great Southern pass. (2,158 mls.)	16,364	15,589	+ 775	70,913	70,650	+ 263
,, ,, goods	32,019	25,828	+ 6,191	117,954	112,941	+ 5,013
,, ,, total	48,383	41,417	+ 6,966	188,867	183,591	+ 5,276

* 30th week.

RAILWAY AND OTHER REPORTS

Pullman Car Co. Ltd.—Gross receipts of the Pullman Car Co. Ltd. for the year ended September 30, 1933, were £270,046, an increase of £10,043, or 3·86 per cent. Working expenses, at £203,078, were higher by £8,804, or 4·53 per cent., leaving net receipts of £66,968, which showed an improvement of £1,239, or 1·88 per cent. Profits, after deducting interest charges but before charging depreciation, were £60,137, as compared with £66,518 in 1932. After making provision for depreciation, and interest on 6 per cent. notes and crediting £50,582 brought forward, it is proposed to carry forward £58,942. A further substantial reduction has been made in the indebtedness of the company, which now amounts to £82,000, and negotiations are in progress for an issue of debentures to repay this amount. During the past year the L.M.S.R. Company, following the reorganisation of its Scottish services, gave notice that the contract with the Pullman Company, on the point of termination, would not be renewed. Services in England for the 22 cars involved could not be found, and the Pullman Company was faced with the alternative of having these cars idle or accepting the low value of £21,000 placed upon them by the L.M.S.R. This price was finally accepted and the cars sold in December. The sale of these cars below their book value and further depreciation required to bring the rolling-stock into accord with present-day practice necessitates a reduction of capital before a distribution of earnings can be made to the shareholders. The directors expect in the near future to submit a scheme of capital re-arrangement.

Mersey Railway.—The Secretary writes, January 25: "The directors, at their meeting on the 25th instant, resolved to pay the full dividend of 3 per cent. on the perpetual preference stock and to recommend a payment of a dividend of ½ per cent. on the ordinary stock. The dividend on the ordinary stock for 1932 was ½ per cent."

CONTRACTS AND TENDERS

According to Reuters, representatives of the Polish Ministries of Finance and Communications have signed at Warsaw a preliminary agreement with the Westinghouse Brake & Saxby Signal Company. The value of the contract is stated to be £4,642,857 at present rates. The work will be completed in six years, and about 60 per cent. of the total order will be carried out in Poland.

Following the call for tenders by the L.M.S.R. for new third-class passenger coaches, as announced in THE RAILWAY GAZETTE for January 12, orders have now been placed as follow :—

Metropolitan - Cammell Carriage, Wagon & Finance Co. Ltd. : 50 vestibuled third-class coaches.

Birmingham Railway Carriage & Wagon Co. Ltd. ; 50 vestibuled third-class coaches.

R. G. Pickering & Co. Ltd. : 20 vestibuled composite third-class brake vans.

William Boby & Co. Ltd. has received orders for lime soda softeners from the L.N.E.R. for a plant to be erected at King's Cross station, having a daily capacity of 960,000 gallons, and from the Southern Railway for a plant to be erected at the railway company's Lancing works, of a daily capacity of 36,000 gallons. These orders are additional to plants already in hand for the L.N.E.R. at Bawtry, and for the Southern Railway at Longhedge (Battersea), each of a daily capacity of 480,000 gallons, to which reference has already been made in THE RAILWAY GAZETTE.

The Barrow Haematite Steel Co. Ltd. has secured an order from the Southern Railway for 3,500 tons of conductor rails and 2,000 tons of running rails.

The important contract received by Bruce Peebles & Co. Ltd., of Edinburgh (to which brief reference was made in our issue of January 19), is for the manufacture, supply, and complete erection of 23 rectifier equipments for the Eastbourne-Lewes-Hastings, and Sevenoaks electrification extensions of the Southern Railway. This contract, representing 57,500 kW. of rectifiers, is the largest of its kind ever placed in Great Britain, and follows the order Bruce Peebles received in co-operation with Brown Boveri for 18 rectifier equipments for the London-Brighton-West Worthing extension of the Southern Railway, opened in January, 1933. The contract embraces 23 Peebles-Brown Boveri steel cylinder type mercury arc rectifiers with main and auxiliary transformers, re-cooler equipments, control panels and accessories. Each rectifier will be designed for a normal D.C. output of 2,500 kW. at 660 volts and overloads up to 8,000 kW. The main transformers will be of the oil-immersed self-cooled type designed to operate on the H.T. side at 33,000 volts, three-phase, 50 cycles, and the secondary windings will be double six-phase connected, there being 12 anodes on each rectifier. Each equipment will be completely automatic in its operation, once the main circuits have been operated by remote control.

Commer Cars Limited has received an order from Carter, Paterson & Co. Ltd. for another 25 Pug two-ton vehicles, making the total number ordered of this model up to fifty-five.

The Metropolitan-Vickers Electrical Co. Ltd. has secured a part contract from the L.M.S.R. for Cosmos electric lamps for a period of sixteen months ending April 30, 1935.

The Drewry Car Co. Ltd. has secured a further repeat order from the Eagle Oil & Transport Company for two diesel locomotives of the 0-6-0 type, both of which will be fitted with Gardner 6-L-2 engines.

In THE RAILWAY GAZETTE of last week we published exclusively the announcement that the South African Railways Administration had called for tenders for 50 steam locomotives of the 19C class. We have since been notified that the closing date for receipt of tenders has been extended to March 12, and that certain amendments to the original specification have been made.

The Directors of the Great Western Railway have authorised the placing of the following contracts :—

Three 3-ton Scammell tractors, each with two trailers; and three 6-ton Scammell tractors, each with two trailers: Scammell Lorries Limited.

One Latil tractor: Latil Industrial Vehicles Limited.

One heavy 12-h.p. Austin van, and one Ford Imperial limousine: The Austin Motor Company, and R. Pratt & Sons, respectively.

Provision and installation of automatic and manual telephone exchange equipment at Bristol (Temple Meads) station: The Automatic Electric Co. Ltd.

Construction of platforms, subways, and other works at Bristol (Temple Meads) station: Shanks & McEwan Limited.

Erection of new offices at Park Royal goods station: R. Mansell Limited.

Supply of steelwork: The Patent Shaft & Axletree Co. Ltd.

Supply and erection of roof and wall sheeting at the cupola house of the chair foundry at the company's Swindon works: The Wolverhampton Corrugated Iron Co. Ltd.

The Associated Equipment Co. Ltd. has received the following repeat orders from railway-associated omnibus operators :—

London Passenger Transport Board—two Q-type double-deckers, and 100 oil-engined Regent double-deckers.

Crosville Motor Services Limited—a Q-type double-decker.

City of Oxford Motor Services Limited—four Regent double-deckers.

Western Welsh Omnibus Co. Ltd.—four oil-engined Regent double-deckers, and eight oil-engined Regal single-deckers.

East Midland Motor Services Limited—two Regal-4 single-deckers.

Leyland Motors Limited has recently received orders from railway-associated road transport concerns as follow :—City of Oxford Motor Services Limited : Eight Lion buses ; Wilts & Dorset Motor Services Limited : Two Titan buses ; Eastern National Omnibus Co. Ltd. : Two Titan buses ; Carter, Paterson & Co. Ltd. : Two Beaver lorries.

The Commercial Secretary to H.M. Legation, Tehran, reports that the Department of Industry and Agriculture is calling for tenders, to be presented in Persia by March 6, for the supply of rails, turntables, switches, electric hoists, steel cable, and truck axles. Further details may be obtained from the Department of Overseas Trade.

The Vacuum Oil Company has received official notification from the Keeper of the Privy Purse that the company has been awarded the Royal Warrant as purveyor of oil and grease to the King. The Vacuum Oil Company was established in Liverpool in 1886 and was incorporated as a limited company in 1901. Its works at Birkenhead and Wandsworth are the largest of their kind in this country dealing exclusively with lubricants.

BALKAN RAILWAY CONSTRUCTION.—Two new standard-gauge lines have recently been opened by the Bulgarian State Railways, the first from Plordio to Karlowo, 38 miles, and the second from Plordio to Panagyurishte, 44 miles. Neither line is an extension of any previous section.

THE RIVIERA EXPRESS.—The International Sleeping Car Company announces that the famous Riviera Express between Berlin and Rome, which makes only one trip weekly in each direction, is being run this year from January 27 to May 1. It will leave Berlin at 12.50 p.m., reaching Milan at 7 the next morning, where it divides, one portion arriving at Cannes at 1.50 p.m., and the other at Rome at 7.15 p.m. In the reverse direction it will leave Rome at 10.25 a.m., Cannes at 12.55 p.m., and Milan at 10.40 p.m., arriving in Berlin at 4.32 p.m. the next afternoon. The first trip from Rome was on January 30, and the last is to be on May 1. The last trip from Berlin is on April 28.

RAILWAY DEVELOPMENT IN SIAM.—The Government of Siam has, according to *Industrial and Labour Information* (published by the I.L.O.), adopted a general programme of economic development which will be directed to the establishment of an independent currency board, acceleration of work connected with railways, posts, telegraphs and telephones, in accordance with a specific plan already determined, construction of a system of roads with the object of facilitating communication between centres of production and markets, provision of a network of waterways adequate for the needs of the country by maintaining and improving the existing channels of inland navigation and opening new ones where necessary, and development of air transport. Other matters covered are the promotion of scientific research and a general survey of the natural resources of the country with a view to their fuller utilisation.

LEGAL AND OFFICIAL NOTICES

Chinese Government Purchasing Commission

THE Commission is prepared to receive Tenders from British manufacturers for the supply of :—

(A) 12 PAIRS OF WHEELS AND AXLES,
(B) 240 COIL SPRINGS; 5 TONS FLAT SPRING STEEL,
(C) 248 TYRES,
(D) 24 CAST STEEL AXLEBOXES,
(E) 1 STEEL FIREBOX,
(F) 200 BOILER TUBES.

Tender Forms, Specifications and Drawings can be obtained on and after February 6th at the Offices of the Consulting Engineers, Messrs. Sandberg, 40, Grosvenor Gardens, London, S.W.1.

A non-returnable fee of 5s. will be charged for each set of documents.

South Indian Railway Company Limited

THE Directors are prepared to receive Tenders for the supply of :—

COPPER PLATES (FLANGED AND FLAT).

Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Co. Ltd., marked "Tender for Copper Plates," with the name of the firm tendering, must be left with the undersigned not later than 10 a.m. on Friday, the 16th February, 1934.

The Directors do not bind themselves to accept the lowest or any Tender.

A charge, which will not be returned, will be made of 5s. for each copy of the Specification.

Copies of the drawings may be obtained at the Offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, Westminster, S.W.1.

A. MUIRHEAD,
Managing Director.

91, Petty France,
Westminster, S.W.1.
31st January, 1934.

PATENTS for Inventions, Trade Marks, Advice, Handbook, and consultations free. King's Patent Agency, Ltd. (B. T. King, C.I.M.E., Registered Patent Agent, G.B., U.S., and Canada), 146A, Queen Victoria Street, London, E.C.4. 49 years' references. 'Phone City 6161.

OFFICIAL ADVERTISEMENTS.

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to :—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

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IN THE COURT of the Railway Rates Tribunal

Road and Rail Traffic Act, 1933. Agreed Charges.

NOTICE IS HEREBY GIVEN that Applications for the approval of Agreed Charges under the provisions of Section 37 of the Road and Rail Traffic Act, 1933, short particulars of which are set out in the Schedule hereto, have been lodged with the Railway Rates Tribunal.

Particulars of the said Agreed Charges, and the said Applications, may be inspected at the Office of the Tribunal, 2, Clement's Inn, Strand, London, W.C.2, at any time during office hours and at the places specified in the sixth column of the said Schedule. A copy of each Application lodged with the Tribunal can be obtained from Mr. G. Cole Deacon, Secretary, Rates and Charges Committee, 35, Parliament Street, Westminster, London, S.W.1, price 1s., post free.

Notices of objection by any parties entitled to object to the approval of any of the said Agreed Charges must state concisely the grounds of objection and must be filed at the office of the Registrar, 2, Clement's Inn, Strand, London, W.C.2, on or before the 20th day of February, 1934, and a copy thereof on or before the same day served on or sent by registered post to Mr. G. Cole Deacon, at the above address. A separate Notice must be filed and served in respect of each Application.

Each Notice filed must be on foolscap size paper and must be stamped with an adhesive fee stamp for 2s. 6d. (which can be purchased at the office of the Tribunal only). If sent by post for filing each Notice must be accompanied by a Postal Order for 2s. 6d. payable to the Registrar, when a stamp will be affixed at the office. A Notice by a Representative Body of Traders must contain a statement of the facts upon which such Body claims to represent a substantial number of traders interested in, or likely to be affected by the decision on, the application.

Four additional copies of each Notice must be lodged with the original at the office of the Registrar.

T. J. D. ATKINSON,
Registrar.

29th January, 1934.

Number of Application	Date of Lodgment	Railway Company	Person or Firm	Nature of Agreed Charge	Where Available for Inspection
1934, No. 39	Jan. 26, 1934	G.W., L. & N.E., L.M. & S., L.P.T.B. (MET. SECN.), SOUTHERN AND MERSEY	F. W. WOOLWORTH & CO. LTD., New Bond Street, London	Percentage on purchase price. All goods for sale, or use at traders' stores, with certain exceptions	Railway Clearing House, London.
,, ,, 40	,,	L. & N.E. and L.M. & S.	The DISTRIBUTERS and TRANSPORTERS LTD. (MESSRS. UNILEVER'S DISTRIBUTING ORGANISATION), Unilever House, London *Applicable also to traffic consigned by :—* VAN DEN BERGHS & JURGENS (SALES) LTD., Unilever House, London A. J. MILLS & CO. LTD., Colonial House, Tooley Street, S.E.1 THE NEW MARGARINE WORKS LTD., 1, William Street, E.C.4 THE NATIONAL MARGARINE CO. LTD., 6, Water Street, London, E.C.4 HAGEMANN'S CREAMERIES (1929) LTD., 1, William Street, London, E.C.4	Per ton Margarine, lard and lard substitutes	Purfleet Goods Station. Railway Clearing House, London.
,, ,, 41	,,	SOUTHERN	The DISTRIBUTERS and TRANSPORTERS LTD. (MESSRS. UNILEVER'S DISTRIBUTING ORGANISATION), Unilever House, London *Applicable also to traffic consigned by :—* JOHN KNIGHT LTD., Silvertown, London T. H. HARRIS & SONS LTD., Stratford, London OGSTON & TENNANT LTD., Stratford, London EDWARD COOK & CO. LTD., Bow, London F. HEWTHORN & CO. LTD., Bow, London D. & W. GIBBS LTD., Wapping, London A. & F. PEARS LTD., Isleworth, London T. B. ROWE & CO. LTD., Brentford, London C. H. PARSONS & BROTHER LTD., Bow, London HAZLEHURST & SONS LTD., Bow, London HODGSON & SIMPSON LTD., Bow, London TYSON & CO. LTD., Bow, London WILKIE & SOAMES LTD., Bow, London PRICE'S SOAP CO. LTD., Bow, London	Per ton Soap, soap with towels, margarine, lard and lard substitutes	Railway Clearing House, London.

Legal and Official Notices—(*continued.*)

Number of Application	Date of Lodgment	Railway Company	Person or Firm	Nature of Agreed Charge	Where Available for Inspection
1934, No. 41	Jan. 26, 1934	SOUTHERN	SIMPSON & CO. LTD., Bow, London UNITED EXPORTERS LTD., Unilever House, London VINOLIA CO. LTD., Unilever House, London CRAIGMILLAR CREAMERY CO. LTD., Craigmillar, Midlothian BALLOCHMYLE CREAMERY CO. LTD., Mauchline, Ayrshire NATIONAL MARGARINE CO. LTD., 6, Water Street, London, E.C.4 WILLIAM GOSSAGE & SONS LTD., Widnes, Lancs F. S. CLEAVER & SONS LTD., 4, Lloyds Avenue, London, E.C.3 ERASMIC CO. LTD., Bank Quay, Warrington BENJAMIN BROOKE & SONS LTD., Port Sunlight, Ches. R. S. HUDSON LTD., Bank Hall, Liverpool BRITISH CREAMERIES LTD., 1, William Street, London, E.C.4 DE BRUYN LTD., Unilever House, London HAGEMANN'S CREAMERIES (1929) LTD., 1, William Street, London, E.C.4 A. J. MILLS & CO. LTD., Colonial House, Tooley Street, London, S.E.1 CAMPBELL JAMES & CO. LTD., 1, William Street, London, E.C.4 NEW MARGARINE WORKS LTD., 1, William Street, London, E.C.4 VAN DEN BERGHS & JURGENS (SALES) LTD., Unilever House, London JOSEPH WATSON & SONS LTD., Whitehall Works, Leeds J. CROSFIELD & SONS LTD., Warrington LEVER BROS. LTD., Port Sunlight, Cheshire BRITISH SOAP CO. LTD., Unilever House, London	Per ton Soap, soap with towels, margarine, lard and lard substitutes	Railway Clearing House, London
.. .. 42	..	SOUTHERN	The DISTRIBUTERS and TRANSPORTERS LTD. (MESSRS. UNILEVER'S DISTRIBUTING ORGANISATION), Unilever House, London *Applicable also to traffic consigned by:—* LEVER BROS. LTD., Port Sunlight, Cheshire THE BRITISH SOAP CO., Unilever House, London	Per ton Soap, and soap with towels	Dover Town Goods Station. Shoreham-by-Sea Goods Station. Portsmouth Town Goods Station. Poole Goods Station. Railway Clearing House, London.
.. .. 43	..	SOUTHERN	The BRITISH OIL & CAKE MILLS LTD., Unilever House, London	Per ton Meals and husks and poultry food	Kingston Wharf Goods Depot. Railway Clearing House, London.
.. .. 44	..	L. & N.E. and L.M. & S.	BETTERWEAR PRODUCTS LTD., West Ham, London	Per package Brushes and polishes	Railway Clearing House, London.
.. .. 45	..	G.W., L. & N.E., L.M. & S., and SOUTHERN	FULLERS LTD., Hammersmith, London	Per package Cakes and confectionery, with incidentals	Railway Clearing House, London.
.. .. 46	..	L. & N.E. and L.M. & S.	GRATTAN ROAD WAREHOUSES LTD., Bradford (Yorks)	Per package Clothing, drapery and general stores ware	Bradford Forster Square Passenger Station. Railway Clearing House, London.
.. .. 47	..	CHESHIRE LINES COMMITTEE, G.W., L. & N.E. and L.M. & S.	WORLD-WIDE WHOLESALE WAREHOUSES, Manchester	Per package Furniture and household requisites	L.M. & S. Goods Office, Victoria Station, Manchester. Railway Clearing House, London.

British and Irish Railway Stocks and Shares

Stocks	Highest 1933	Lowest 1933	Prices Jan. 31 1934	Prices Rise/Fall
G.W.R.				
Cons. Ord. ...	55½	31	56½	−1
5% Con. Prefce. ...	109¾	69½	113	—
5% Red.Pref.(1950)	109¼	87½	112½	+½
4% Deb.	108 15/16	99¼	107	−1½
4½% Deb.... ...	108	100¾	110½	—
4½% Deb.... ...	116	106	117½	—
5% Deb.	128	117¼	128½	—
2½% Deb.... ...	65	60	64½	—
5% Rt. Charge ...	124	111½	124½	—
5% Cons. Guar. ...	122	103	124½	—
L.M.S.R.				
Ord.	29⅞	12⅛	26½	−½
4% Prefce. (1923)	51	17	52	−3
4% Prefce. ...	72	33¼	76	—
5% Red. Prf. (1955)	93	47¼	96½	—
4% Deb.	103¼	89½	102½	+½
5% Red.Deb.(1952)	114	105	112½	—
4% Guar.	97¼	68⅜	99	—
L.N.E.R.				
5% Pref. Ord. ...	22½	7¾	20	−1
Def. Ord.	10¾	4⅛	10	—
4% First Prefce. ...	65½	19⅜	65	−½
4% Second Prefc .	40½	12¼	38½	−1
5% Red.Pref.(1955)	83¾	27	82½	−1
4% First Guar. ...	94¾	58¼	96	—
4% Second Guar.	89¼	48	90	—
3% Deb.	77	60¼	76	—
4% Deb.	02¾	80	101	—
5% Red.Deb.(1947)	112	102½	111	—
4½% Sinking Fund Red. Deb.	107½	98¾	106½	—
SOUTHERN				
Pref. Ord.... ...	71	27¾	69	−1
Def. Ord.	24⅜	9⅝	20	−½
5% Prefce. ...	107 11/16	74	109	—
5% Red.Pref.(1964)	107¾	78⅞	112½	+½
5% Guar. Prefce.	124¼	102¾	122½	—
5% Red.Guar.Pref. (1957)	115⅝	103½	115½	—
4% Deb.	107½	96¾	106	—
5% Deb.	126½	114¼	127½	—
4% Red. Deb. 1962–67	107¼	100	106½	—
BELFAST & C.D.				
Ord.	6	4	6	—
FORTH BRIDGE				
4% Deb.	99½	95½	99½	—
4% Guar. ...	98½	94	99½	—
G. NORTHERN (IRELAND)				
Ord.	7½	3½	5	—
G. SOUTHERN (IRELAND)				
Ord.	28	16	24¾	−¼
Prefce.	24	12⅛	19	—
Guar.	42	16¾	40	−4
Deb.	60	30⅞	60	−2
L.P.T.B.				
4½% "A" ...	117⅞	112	116	—
5% "A"	127¼	119¼	126	—
4½% "T.F.A." ...	111¼	106	109½	—
5% "B"	122½	114	120½	−½
"C"	86¾	74½	84	−1
MERSEY				
Ord.	16¼	5	13	—
4% Perp. Deb. ...	83	63⅞	85½*	+4
3% Perp. Deb. ...	62	51	63½*	+1
3% Perp. Prefce....	50⅝	27	49½	—

* ex dividend.

Railway Share Market

The stock and share markets have held firm with a steady volume of business, although the amount of transactions in home railway stocks has tended to decrease pending the issue of the dividend statements of the big four groups of companies. The Stock Exchange and investors generally have already discounted the improvement as far as it is possible to gather it from the gross traffic receipts. Consequently, they are deferring any further operations until the full details showing the extent of the economies effected are available.

The first of the announcements will be made next Wednesday by the London Midland & Scottish Railway and the market is anticipating that the net revenue will show that between 3 and 4 per cent. was earned on the 4 per cent. (senior) preference stock of the company last year. A return is expected, therefore, on both the 4 per cent. stock and the 5 per cent. redeemable preference which ranks *pari passu* with it, but the market is not looking for any return on the 1923 preference stock. At the same time the latter stock has held the bulk of the big rise which has taken place in the quotation during the last few months as current opinion is that the stock will probably earn the full 4 per cent. in the present year. This and other estimates which may prove to be too optimistic may have to be revised later when the accounts for 1933 are issued, but for the present Stock Exchange jobbers regard market values as fairly representative of prospects.

The intimation that a downward revision of first-class fares may be expected has been received favourably, as it will tend to swell the weekly traffic returns, it is thought, in much the same way as happened after the incoming of the Summer fares for third class passengers. The largest movement in list quotations this week was in the Mersey 3 per cent. debenture which rose one to two points at the "ex" dividend prices. Foreign railway stocks have been irregular. Whilst the debenture stocks of the Argentine and other railways in South America have been in some speculative request the general tendency has been for the ordinary stocks to weaken. Leopoldina Terminal 6½ per cent. debenture stock, which gives a high yield at the current price, had a rise on successive days of some points owing to a demand coming on a market short of stock. The 4 per cent. Leopoldina debenture also advanced but subsequently reacted and both the Leopoldina and the San Paulo ordinary stocks were quoted lower on the week. Indian railway stocks fell in some directions on the statement at the meeting of the Bengal & North Western that the earnings of the railway may suffer severely as a result of the earthquake.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1933–34	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1933	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1933	Prices: Lowest 1933	Prices: Jan. 31, 1934	Yield (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	830	28.1.34	12,820	+ 4,790	4	46,830	35,690	+ 11,140	Ord. Stk.	26	11¾	22	Nil
	Argentine North Eastern	753	27.1.34	9,200	+ 1,100	30	305,200	341,200	− 36,000		14½	5	10½	Nil
	Argentine Transandine	111	13.1.34	1,540	+ 130	28	30,950	5,640	+ 25,310	A. Deb.	55	40	50	8
	Bolivar	170	Dec., 1933	5,350	− 1,250	52	72,700	89,350	− 16,650	6 p.c. Db.	10	5	10	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	15	11	12½	4
	Buenos Ayres & Pacific	2,806	27.1.34	135,000	+ 3,000	30	2,902,000	3,066,000	− 164,000	Ord. Stk.	26	97/16	15½	Nil
	Buenos Ayres Central	190	21.1.34	10,127	+ 1,615	30	301,476	277,481	+ 23,995	Mt. Db.	30	10	27½	Nil
	Buenos Ayres Gt. Southern	5,075	27.1.34	260,000	− 15,000	30	5,611,000	5,540,000	+ 71,000	Ord. Stk.	44½	21½	33½	Nil
	Buenos Ayres Western	1,926	27.1.34	75 000	− 15,000	30	1,861,000	1,955.000	− 94,000	,,	34½	15¾	26½	Nil
	Central Argentine	3,700	27.1.34	‡216,000	+ 36,000	30	4,847,000	5,591,000	− 744,000	,,	28½	15	21½	Nil
	Do.	—	—	—	—	—	—	—	—	Pfd.	18	10	13½	Nil
	Cent. Uruguay of M. Video	273	27.1.34	17,751	+ 3,092	30	489,040	462,753	+ 26,287	Ord. Stk.	20	8	14	Nil
	Do. Eastern Extn.	311	2 .1.34	4,180	+ 929	30	94,907	97,874	− 2,967	—	—	—	—	—
	Do. Northern Extn.	185	27.1.34	1 799	− 384	30	51,927	57,173	− 5,246	—	—	—	—	—
	Do. Western Extn.	211	27.1.34	2,217	+ 784	30	46,591	42 582	+ 4,009	—	—	—	—	—
	Cordoba Central	1,218	27.1.34	38,000	+ 3,000	30	1,293,000	1,299,000	− 6,000	Ord. Inc.	9¼	2½	6	Nil
	Costa Rica	188	Nov., 1933	18 534	− 3,195	21	99,724	107,788	− 8,064	Stk.	29	20	25	8
	Dorada	70	Dec., 1933	11,000	+ 2,600	52	96,800	83,600	+ 13,200	1 Mt. Db.	76½	68¾	80	7½
	Entre Rios	810	27.1.34	17,900	+ 5,200	30	477,500	483,400	− 5,900	Ord. Stk.	26½	9	20	Nil
	Great Western of Brazil	1,072	20.1.34	13,100	− 5,600	3	33,800	51,500	− 17,700	Ord. Sh.	23/6	1/2	3/4	Nil
	International of Cl. Amer.	794	Nov., 1933	347.691	− 91 368	47	4,125,768	4,581,088	− 455 320	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	1/2	1/16	1/2	Nil
	La Guaira & Caracas	22¾	Dec., 1933	3.400	− 4,280	52	55 670	87,795	− 32,125	Stk.	16	10	12½	Nil
	Leopoldina	1,918	27.1.34	22.273	− 3,191	4	75,435	94,185	− 18,750	Ord. Stk.	20¼	10	14	Nil
	Mexican	483	21.1.34	$217,500	+ $50,800	3	$570,100	$494,000	+ $76,100	,,	3	1/2	2½	Nil
	Midland of Uruguay	319	Dec., 1933	11 542	+ 2,105	26	57,230	52,204	+ 5,026	Ord. Stk.	2	1	2	Nil
	Nitrate	407	15.1.34	15,955	+ 13,575	2	15,955	2,380	+ 13,575	Ord. Sh.	78/6	11/16	3/8	Nil
	Paraguay Central	274	20.1.34	3 280	+ 760	29	95,000	81,400	+ 13,600	Pr. Li. Stk.	72	49½	67	8 5/16
	Peruvian Corporation	1,059	Dec., 1933	54,751	+ 7,517	26	329,691	345 773	− 16,082	Pref.	15¼	5	11½	Nil
	Salvador	100	20.1.34	1.759	− 3,069	30	29,493	61,992	− 32,499	Pr. Li. Db.	70	66½	70	7⅛
	San Paulo	1531/2	21.1.34	29,385	− 15,037	3	85,973	91.139	− 5,166	Ord. Stk.	102	68	82	2 7/16
	Taltal	164	Dec., 1933	8 915	+ 7,855	26	31,065	8,115	+ 22,950	Ord. Sh.	1¾	¾	1⅝	6 3/16
	United of Havana	1,365	27.1.34	14,481	+ 1,129	30	394,398	427,948	− 33.550	Ord. Stk.	8	2	6	Nil
	Uruguay Northern	73	Dec., 1933	1,298	− 706	26	7,383	9,915	− 2,532	Deb. Stk.	6	3½	5	Nil
Canada	Canadian National	23,758	21.1.34	537,490	+ 81,862	3	1,536,061	1.288,904	+ 247,157	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	—4 p.c.	Perp. Dbs.	60½	38	61	6 9/16
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	99¾	85	100½	4
	Canadian Pacific	17,024	21.1.34	395,000	+ 10,600	3	1,173,600	1.014,200	+ 159,400	Ord. Stk.	22⅛	11	16	Nil
India†	Assam Bengal	1,329	30.12.33	21,682	− 1,958	39	914,458	940.346	− 25,888	Ord. Stk.	79	70	73½	4 1/16
	Barsi Light	202	6.1.34	2 587	− 825	40	116,587	105,450	+ 11,137	Ord. Sh.	101¾	70	98½	6 1/16
	Bengal & North Western	2,113	30.12.33	48.218	+ 366	13	608,063	571,659	+ 36,404	Ord. Stk.	292	240	287	5 9/16
	Bengal Dooars & Extension	161	6.1.34	3 064	+ 621	40	120.279	121,621	− 1.342	,,	127	119	125	5⅝
	Bengal-Nagpur	3,269	30.12.33	105 375	+ 1,757	39	3 966,138	3,751.314	+ 214,824	,,	97¼	83½	97½	4⅛
	Bombay, Baroda & C. India	3.089	20 1 34	164,400	+ 3,900	42	6,150.450	5,998.050	+ 152,400	,,	112	107	110½	5 7/16
	Madras & South'n Mahratta	3.230	30 12.33	102,750	− 13,443	39	4,195.152	4,023 474	+ 171,678	,,	127	114¼	122½	7 5/16
	Rohilkund & Kumaon	546	30.12.33	10,804	+ 900	13	108 888	100,337	+ 8,551	,,	260	225	252	5 11/16
	South India	2,526	6.1.34	73,198	+ 965	40	3,135,352	3,189.450	− 54.098	,,	119½	112	116½	6⅞
Various	Beira-Umtali	204	Nov., 1933	49 677	+ 11,566	8	99,606	80.652	+ 18,954	—	—	—	—	—
	Bilbao River & Cantabrian	15	Dec., 1933	988	+ 48	52	18,980	21,553	− 2,573	—	—	—	—	—
	Egyptian Delta	621	10.1.34	7.108	− 415	41	184,196	205,478	− 21,282	Prf. Sh.	13 1/32	1¾	2	Nil
	Great Southern of Spain	104	20.1.34	2 299	+ 178	3	7,322	6,561	+ 761	Inc. Deb.	4	3	5½	Nil
	Kenya & Uganda	1,625	Aug., 1933	159.746	+ 12,456	35	1,523,550	1,273,216	+ 250,334	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	53	33½	36½	9 9/16
	Mashonaland	913	Nov., 1933	91,764	+ 30,921	8	186 337	122,843	+ 63,494	1 Mg. Db.	91¾	42	94	5 5/16
	Midland o f W. Australia	277	Nov., 1933	12 568	− 412	21	65.111	61,532	+ 3,579	Inc. Deb.	89	70	95½	4 5/16
	Nigerian	1,903	16.12.33	63.791	− 6,032	38	1,072,876	1,176 665	− 103,789	—	—	—	—	—
	Rhodesia	1,538	Nov., 1933	156,230	+ 50 618	8	316.792	213.960	+ 102.832	4 p.c. Db.	98½	80¾	99	4 1/16
	South African	13,151	30.12.33	388,607	+ 47,690	40	17.695,533	15,268,720	+2,426,813	—	—	—	—	—
	Victorian	6,172	Oct., 1933	762 659	− 44,068	17	2,797,539	2,885.003	− 87 464	—	—	—	—	—
	Zafra & Huelva	112	Nov., 1933	10,926	+ 149	47	123,826	120,955	+ 2,871	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16.

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend. ‡ Average rate of exchange for the week :—This year 33 53/64. Last year 41 45/64.